



**2006 Combat Vehicles Conference**

**Dearborn, MI 23-25 October 2006**

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**Wednesday, 25 October 2006**

An RDE Perspective, DR. Grace Bochnek Generating Combat Power Across the Continuum of Operations, BG Donald F. Schenk

FCS Program Overview, COL(P) David Ogg



*Welcome to the 2006 Combat Vehicles Conference  
Revised Agenda*

*Monday, October 23, 2006*

*5:00 p.m. - 7:30 p.m.                      Registration Check-in  
Convention Registration Desk  
Hyatt Regency Dearborn*

*6:00 p.m. - 7:30 p.m.                      Welcome Reception  
Springwells Ballroom  
Hyatt Regency Dearborn*

*Tuesday, October 24, 2006*

*7:30 a.m. - 7:00 p.m.                      Registration Check-in continues  
Convention Registration Desk*

*7:30 a.m. - 8:15 a.m.                      Continental Breakfast  
Hubbard Foyer*

*General Session  
Dearborn Ballroom*

*Session I - "Yesterday's Vision: How we prepared for and fought the war."*

*Session Chair - LTG John S. Caldwell USA (Ret.)  
QSS Group  
and  
Chairman, Combat Vehicles Division, NDIA*

*8:15 a.m. - 8:25 a.m.                      Administrative Announcements*

*8:25 a.m. - 8:45 a.m.                      Welcome to Detroit Remarks  
MG William M. Lenaers, USA  
Commanding General (CG)  
U.S. Army TACOM LCMC*

*8:45 a.m. - 9:30 a.m.                      Acquisition Keynote Address  
LTG Joseph L. Yakovac, Jr., USA  
Military Deputy/Director, Army Acquisition Corps  
Office of the Assistant Secretary of the Army (AL&T)*

*9:30 a.m. - 9:50 a.m.                      Coffee Break  
Hubbard Foyer*



Tuesday, October 24, 2006 (continued)

9:50 a.m. - 10:30 a.m.

Keynote Address  
MG Richard J. Rowe, Jr., USA  
Deputy Director/Chief of Staff,  
Army Capabilities Integration Center, TRADOC

10:30 a.m. - 11:30 a.m.

War Panel: "Operation Iraqi Freedom"  
Moderator: MG Julian B. Burns, USA (Ret.)  
Vice Pres Business Development, BAE Systems

*Panel Members:*

- Col (sel) William R. Costantini, USMC  
the former CO, 1st Light Armored Reconnaissance  
Battalion in Iraq and is currently assigned to the  
J-5 section of the Joint Staff.
- LTC Lanier Ward, USA  
Regimental S3 of the 2nd Cavalry Regiment (2CR)  
Currently Commanding the 2d Squadron, 16th Cavalry,  
Fort Knox, KY
- LTC Thomas B. Plunkett, USANG  
Commander, 3rd Battalion 156th Infantry,  
Louisiana Army National Guard  
Heavy Task Force-mounted Operations
- LTC John Steele, USA  
was a Battalion Commander, then Deputy Commanding Officer  
(DCO) for 1st Brigade, 25th ID (Stryker)  
during combat operations in Iraq.
- BG Alan Gayhart, USA  
Brigade Commander, 116th Heavy Brigade Combat Team  
(Idaho/Oregon/Montana NG) during combat operations in  
Iraq. Now currently serving as the Deputy Commanding  
General for Idaho National Guard.

11:30 a.m. - 12:30 p.m.

Lunch  
Springwells Ballroom

General Session (reconvenes)  
Dearborn Ballroom

*Session II: "Today's Legends: How our legacy systems will contribute to the future."*

Session Chair - Ms. Sherrie Nunn  
Assistant Program Executive Officer, Logistics (PEO, GCS)

12:30 p.m. - 12:35 p.m.

Introductions  
Ms. Sherrie Nunn



Tuesday, October 24, 2006 (continued)

12:35 p.m. - 2:35 p.m.

*PEO & PM Panel*

*Panel Chair: Mr. Kevin Fahey,  
SES Program Executive Officer for Ground Combat Systems*

*Panel Members:*

- *COL Larry Hollingsworth, USA  
PM Heavy Brigade Combat Team*
- *COL Peter Fuller, USA  
PM Stryker Brigade Combat Team*
- *Mr. Patrick Thompson  
Chief, PATCM  
Robotic Systems JPO*
- *Mr. Robert Halle  
Deputy PM, Modular Brigade Enhancements*
- *Col Michael A. Micucci, USMC  
Program Manager, Light Armored Vehicle*

2:35 p.m. - 3:05 p.m.

*Coffee Break  
Hubbard Foyer*

*General Session (reconvenes)  
Dearborn Ballroom*

3:05 p.m. - 5:00 p.m.

*Depot/OEM Panel "Executing RESET"*

*Panel Chair: Mr. Andy Hove, Program Director,  
Bradley Systems, BAE Systems*

*Panel Members:*

- *Mr. Donald Ishmael, Jr. (tentative/invited)  
General Dynamics Rep*
- *Ms Carla Johnson,  
Director, Strategic Equipment Project Office,  
Supply Chain Management Center,  
Marine Corps Logistics Command*
- *LtCol Don Mills, USMC  
Senior Director, Source Management Department,  
Supply Chain Management Center,  
Marine Corps Logistics Command*
- *Mr. Chuck Gripton,  
BAE Systems,  
RRAD representative*

*Panel Q&A*



Tuesday, October 24, 2006 (continued)

5:00 p.m. - 5:30 p.m.      *JSLIST Chemical/Biological Coverall for Combat Vehicle Crewman (JC3) Presentation*  
*Ms. Deborah Singleton,*  
*JSLIST Program Manager,*  
*Office of Joint Project Manager of Individual Protection (JPM-IP)*

*The JC3 is a NBC suit specifically designed for Combat Vehicle Crewman and if approved may be fielded to the U.S. Army and U.S. Marine Corps CVC personnel beginning in FY08.*

5:30 p.m.      *Adjourn for the day*

5:30 p.m. - 7:00 p.m.      *Annual Reception*  
*Springwells Ballroom*

Wednesday, October 25, 2006

7:30 a.m. - 11:45 a.m.      *Registration Check-in continues*  
*Convention Registration Desk*

7:30 a.m. - 8:00 a.m.      *Continental Breakfast*  
*Hubbard Foyer*

*Session III: "Tomorrow's Capabilities: How the future will look and are we preparing properly?"*  
*Session Chair - Mr. Chuck Prikopa*  
*BAE Systems*

8:00 a.m. - 8:10 a.m.      *Introduction / Administrative Remarks*  
*Mr. Chuck Prikopa*  
*BAE Systems*

8:10 a.m. - 9:00 a.m.      *R&D/Future Programs*  
*Dr. Grace Bochenek, USA TARDEC*



Wednesday, October 25, 2006 (continued)

9:00 a.m. - 10:30 a.m.

*Future Combat Systems (BCT)*  
*Panel Chair: COL(P) Robert D Ogg, USA,*  
*Program Manager, Network/Comp Programs*

*Panel Members:*

- *COL Chris DeLuca, USA*  
*Project Manager, Future Combat Systems*  
*(Brigade Combat Team), Spin Out*
- *COL Chuck Coutteau, USA*  
*Project Manager,*  
*FCS Manned Systems' Integration (MSI)*
- *COL Michael Williamson, USA,*  
*Project Manager,*  
*Network Systems' Integration (NSI)*

10:30 a.m. - 11:00 a.m.

*Coffee Break*  
*Hubbard Foyer*

11:00 a.m. - 12:00 noon

*"Generating Combat Power Across the Continuum of*  
*Operations"*  
*BG Donald F. Schenk, USA (Ret.)*  
*First Program Manager, FCS (BCT)*  
*First Program Manager, SBCT*

12:00 noon - 12:15 p.m.

*Closing Remarks*  
*LTG John S. Caldwell, USA (Ret.)*  
*Chairman, Combat Vehicles Division, NDIA*

12:15 p.m.

*Conference Adjourns*





# An RDE Perspective

DR. GRACE BOCHENEK  
DIRECTOR

October 2006



SUPERIOR TECHNOLOGY



FOR A



SUPERIOR ARMY



**RDECOM**

**TACOM**  
The Sustainment and Ground Systems  
Life Cycle Management Command

**TARDEC**  
U.S. ARMY TANK AUTOMOTIVE RESEARCH, DEVELOPMENT AND ENGINEERING CENTER





SUPERIOR TECHNOLOGY FOR A SUPERIOR ARMY

# Center for Unmanned Ground Vehicles (CUGV)

## Mission

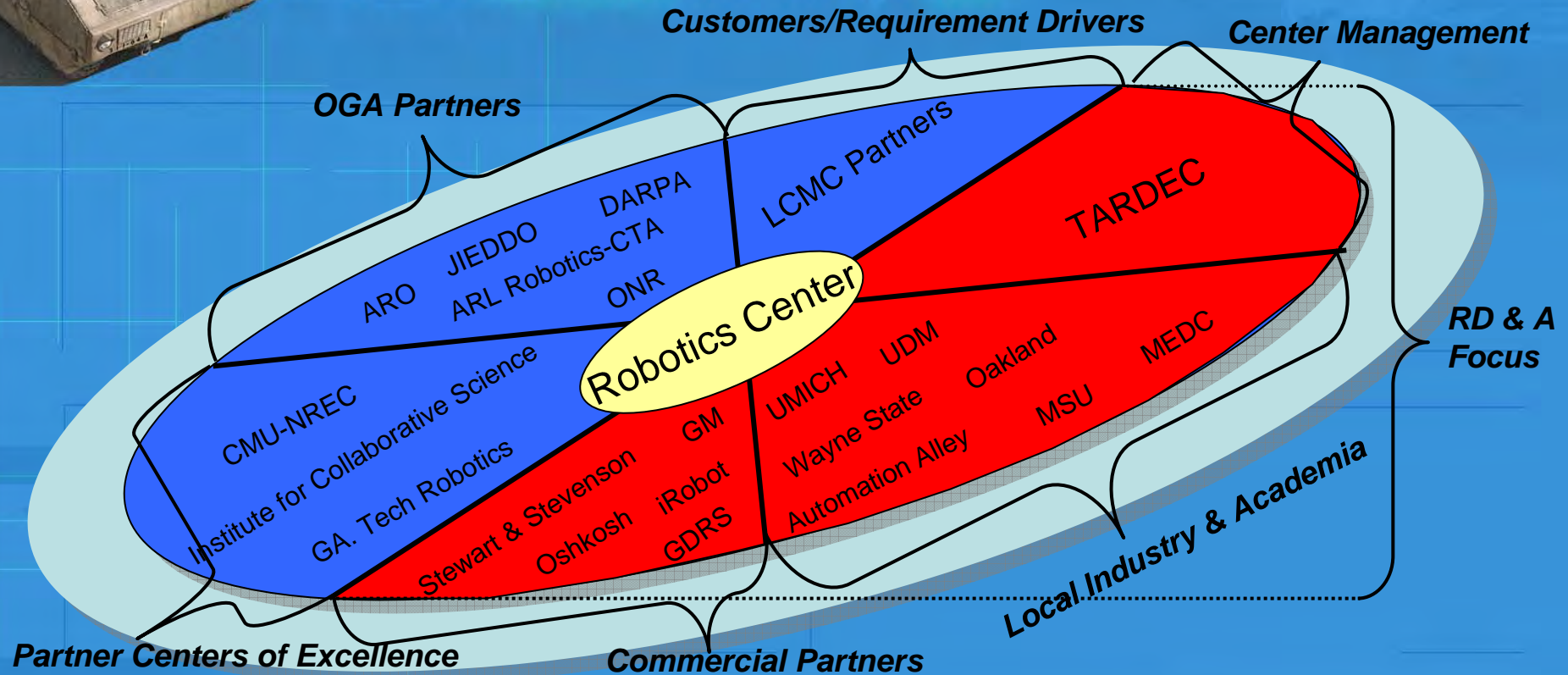
*Establish the U.S. focal point for all military ground vehicle robotics and to provide support across the life cycle spectrum (research, development, acquisition and sustainment) for all current and future military unmanned ground vehicles*





# CUGV - A TARDEC Led Collaboration

SUPERIOR TECHNOLOGY FOR A SUPERIOR ARMY



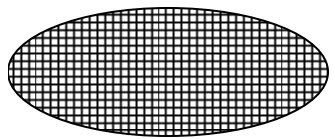
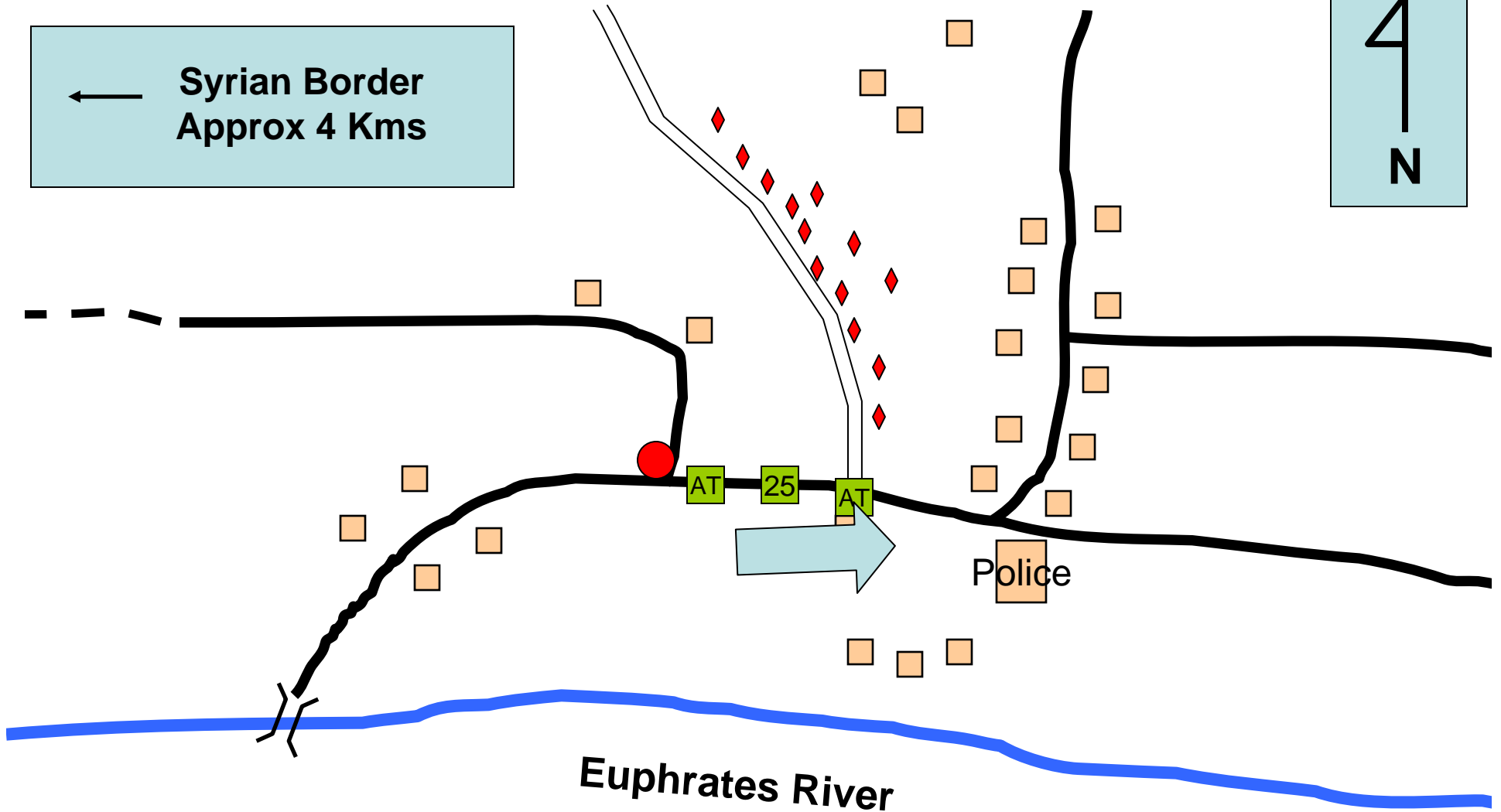
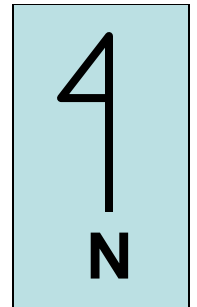
- Leverage the intellectual capital in manned vehicle research, development, acquisition and sustainment support to the LCMC for enabling the transformation of the Army fleet to 33% unmanned ground vehicles by 2015
- Focus on two technology paths:
  - Core Robotic Technologies (e.g. perception, teleoperation, vision)
  - Enabling Robotic Technologies (e.g. mobility, power & energy)







← Syrian Border  
Approx 4 Kms

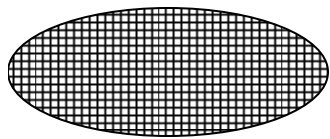
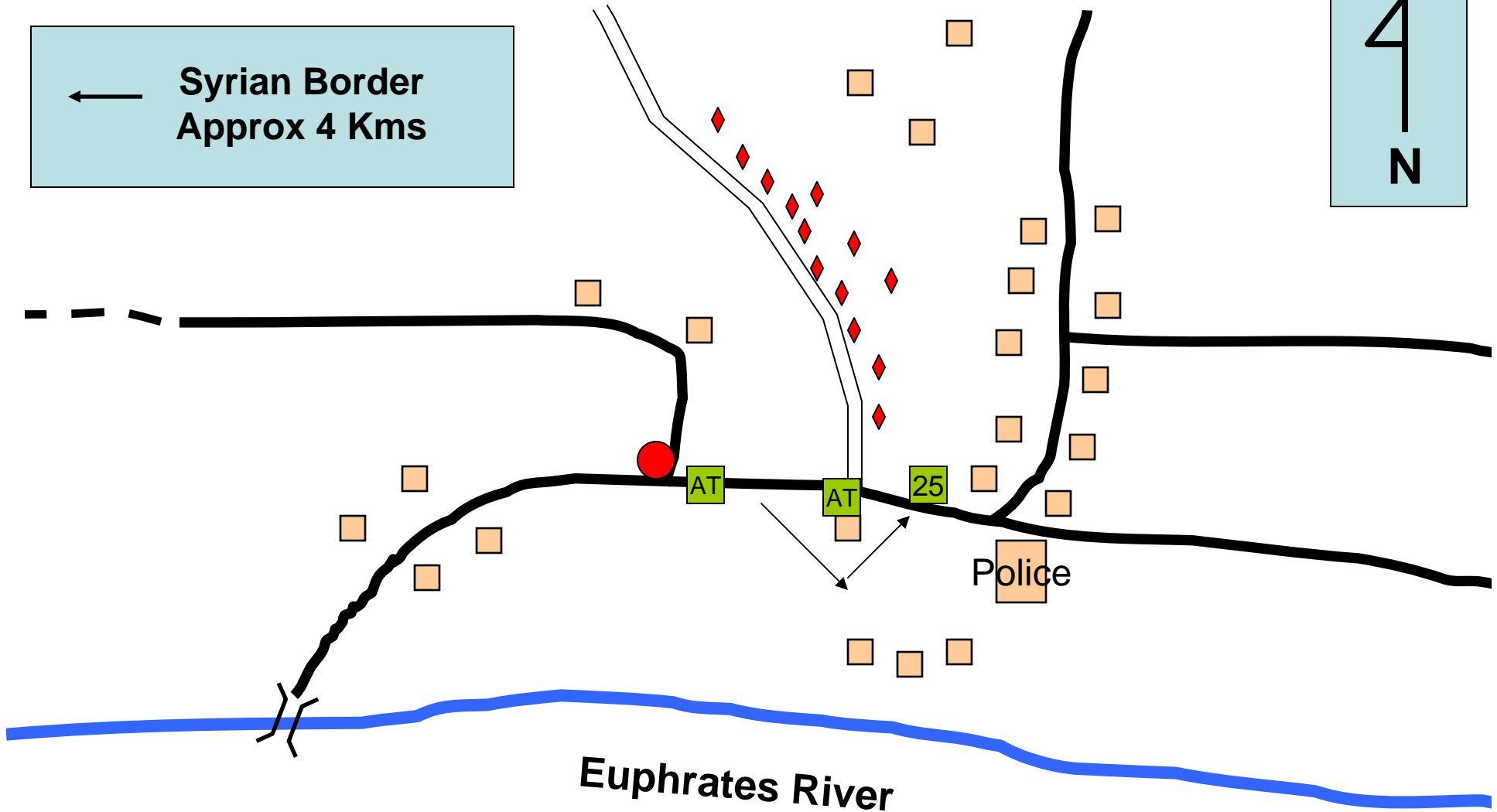
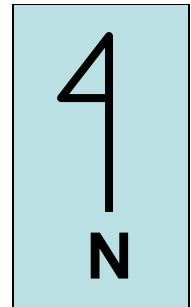


Al Qaim

Map not to scale



← Syrian Border  
Approx 4 Kms



Al Qaim

Map not to scale



PEO-GCS Website:  
[www.peogcs.army.mil](http://www.peogcs.army.mil)



# Program Executive Office Ground Combat Systems

*Acquisition Excellence*

Mr. Kevin Fahey  
Program Executive Officer,  
Ground Combat Systems





# Program Executive Office Ground Combat Systems

Program Executive Office  
Ground Combat Systems



Stryker Brigade  
Combat Team



Heavy Brigade  
Combat Team

- Abrams Tank
- M88 Recovery Vehicle
- Bradley Fighting Vehicle
- Paladin / FAASV
- M113
- Knight



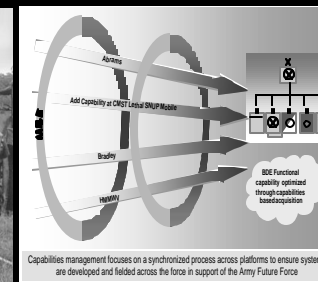
Joint Robotics  
Systems  
(Army & Marine)



Joint  
Lightweight  
Howitzer 155mm  
(Army & Marine)



Modular  
Brigade  
Enhancements



PEO GCS maintains a total Army perspective in managing the development, acquisition, testing, systems integration, product improvement, and fielding that places the best ground combat systems in the hands of our soldiers

*Acquisition Excellence*





## Program Priorities

- Support our soldiers and the GWOT
- Modularity, Reset, Recap
- Spiral Integration
- Ground Combat Investment/Modernization and Sustainment Strategy
- Balance long-term goals and objectives and near-term challenges

**NONE OF THESE ARE MUTUALLY EXCLUSIVE**





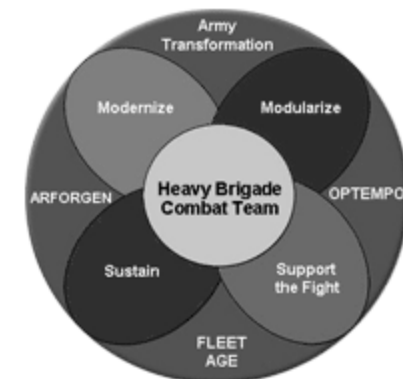
# Army Requirements

## Army Campaign Plan



## Army Mandates and Fleet Sustainment Requirements

- Safety Fixes
- Resolve Obsolescence
- National Level RESET
- CSA Directed Armor Improvements
- FCS SpinOut
- Drive to Common Configuration Baseline across the fleet
- Resolve Existing ORD Shortfalls



Nested Requirements Mapped to ACP Drive Objective Fleet





Program Executive Office  
Ground Combat Systems



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Ground Combat Systems



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## 2006 Combat Vehicle Conference

“Today’s Legends: How our legacy systems will contribute to the future.”

Program Executive Office  
Ground Combat Systems

*Acquisition Excellence*

Mr. Robert Halle

Deputy Project Manager, Modular  
Brigade Enhancements,

PEO GCS

24 Oct 06



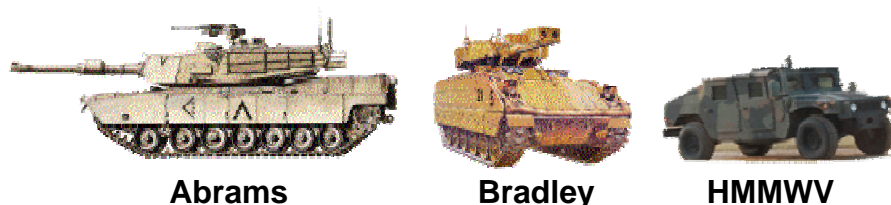


# PM MBE Mission

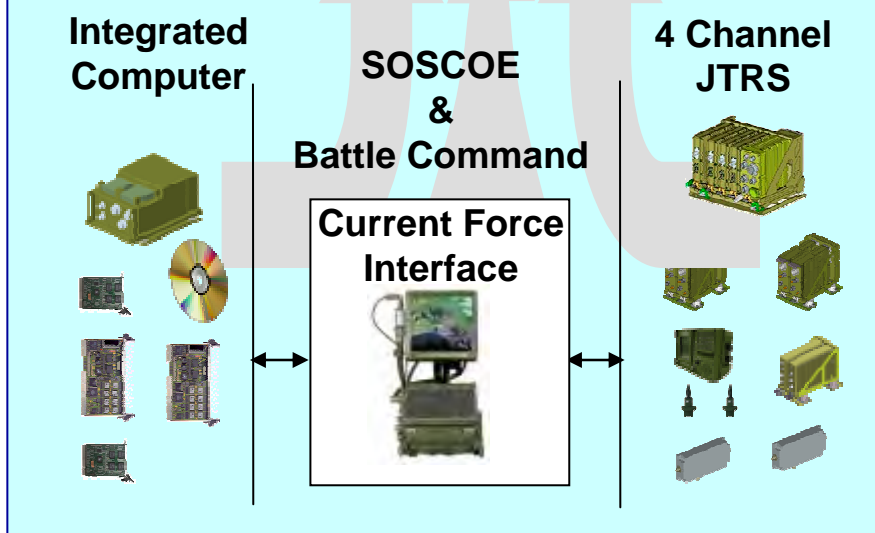
PM Modular Brigade  
Enhancements will serve as the  
***Army's centralized manager***  
for integrating combat capabilities  
into the Army's Modular Brigade Force



# “Spin Out 1” to the Current Force



## Network Capability Integration Kit



## Capability Improvements:

- Force protection
- Precision networked fires
- Interoperability

## Milestones:

- First Network Kit Delivery –2007
- Software Qualification –2007
- Milestone C –2008

## Unattended Munitions



**Relevant to Today's Force**



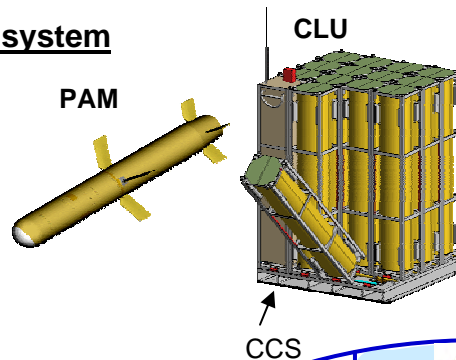


# Spin Out 1 Systems

## Non Line-of-Sight – Launcher system

One NLOS-LS System consists of:

- 1 Container Launch Unit (CLU) with 1 CCS and 15 PAMs
- Hand held control device in Computer Communication System (CCS) (PDA)
- Unit will have Training Prototype CLUs with CCS
- Platform Independent
  - preferred vehicle is FMTV
  - May be fired from any transport vehicle



CLU – Container/Launch Unit  
PAM – Precision Attack Missile  
CCS – Computer & Communications System

## Intelligent Munitions System

One IMS System consists of:

- 1 Control Station and 8 Dispenser Modules
- With the set the Army Unit gets 1 Control Station & 1 Dispenser Module
- With 7 Dispenser Modules in War Reserve: Control Station components will be repair parts (battery, antenna)



IMS Controller (Laptop)

Dispensing Module

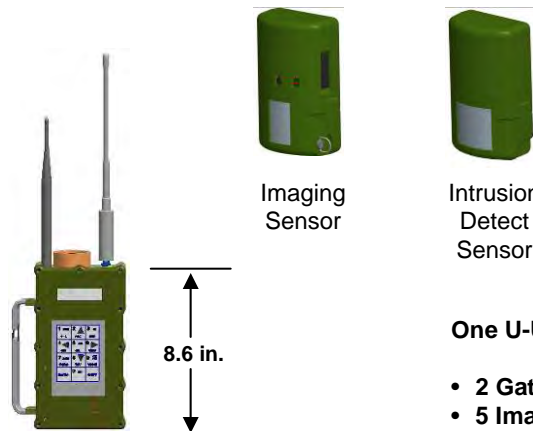
- Gateway
- Munitions
- Sensors



IMS – Intelligent Munitions System



## Urban –Unattended Ground Sensors

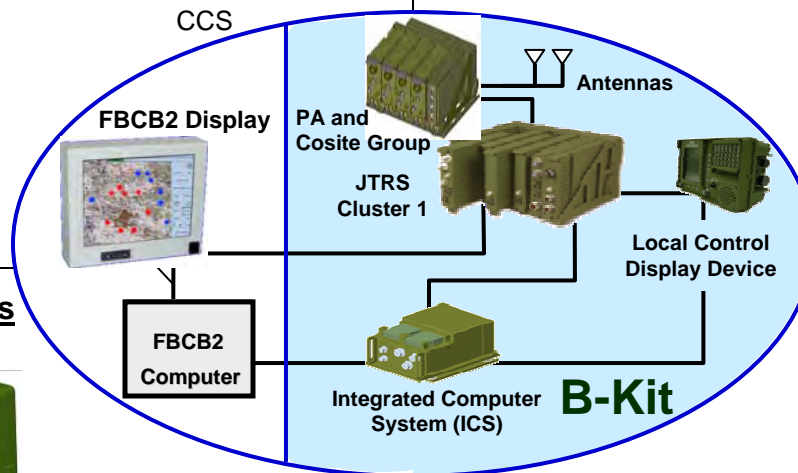


Imaging Sensor

Intrusion Detect Sensor

One U-UGS System consists of:

- 2 Gateways
- 5 Imaging Nodes
- 10 Intrusion Detection Nodes

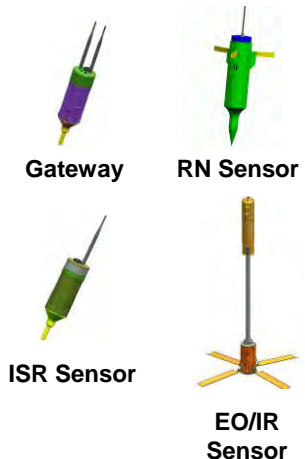


## Tactical – Unattended Ground Systems

One T-UGS System consists of:

- 2 Gateways
- 8 ISR nodes
- 2 EO/IR Sensor Nodes
- 1 RN Node
- 1 HCLM Node

ISR – Intelligence, Surveillance, and Reconnaissance  
EO/IR – Electro-Optic Infrared Sensor  
RN – Radiological Nuclear  
HCLM – Hazard/Clear Lane Markers



Gateway

RN Sensor

ISR Sensor

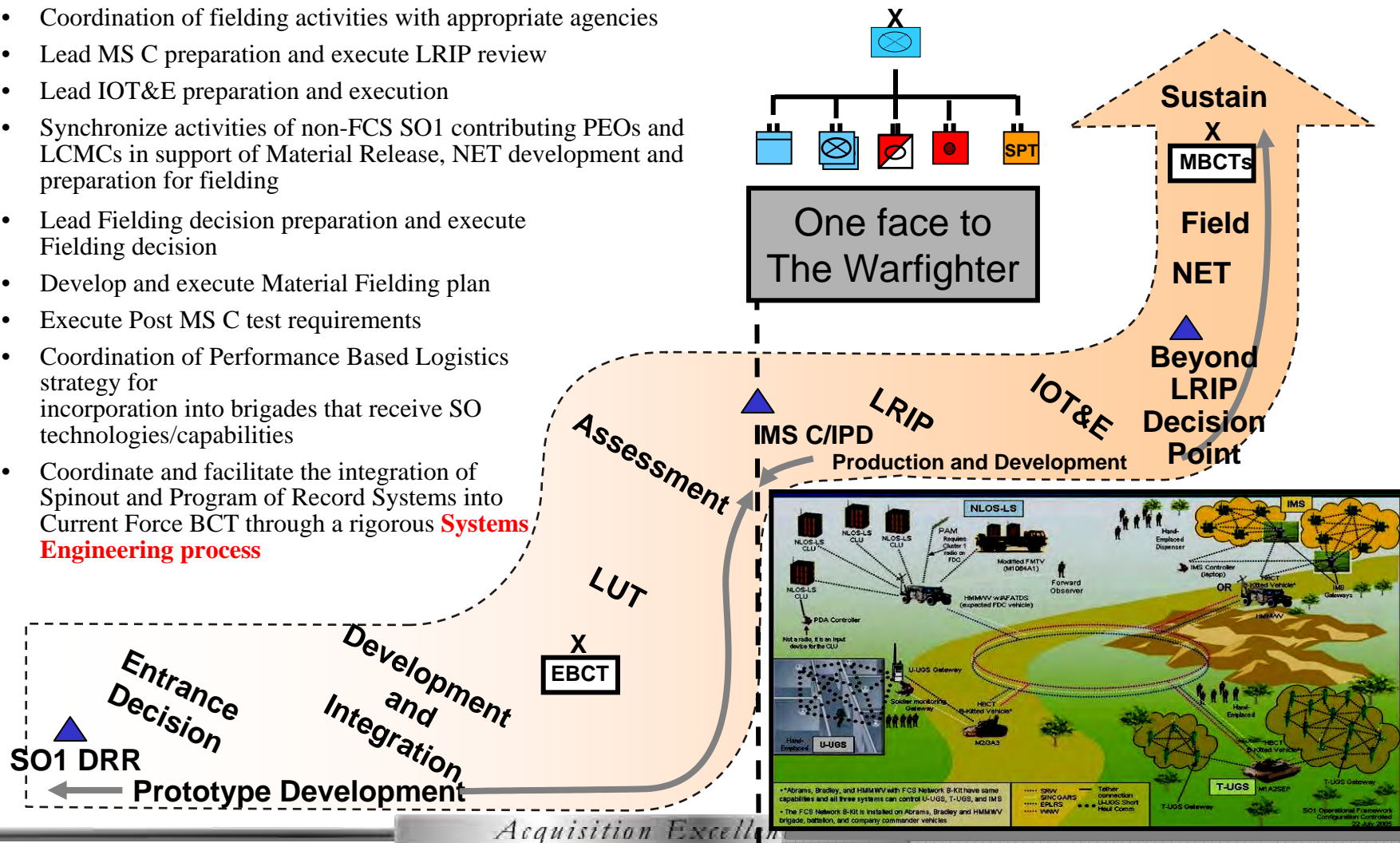
EO/IR Sensor





# PM MBE Mission

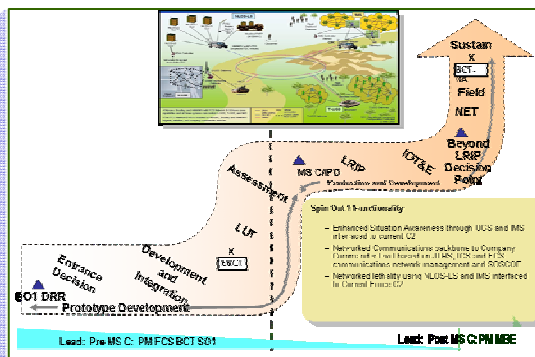
- Coordination of installed performance for current platforms integrated with FCS content
- Coordination of fielding activities with appropriate agencies
- Lead MS C preparation and execute LRIP review
- Lead IOT&E preparation and execution
- Synchronize activities of non-FCS SO1 contributing PEOs and LCMCs in support of Material Release, NET development and preparation for fielding
- Lead Fielding decision preparation and execute Fielding decision
- Develop and execute Material Fielding plan
- Execute Post MS C test requirements
- Coordination of Performance Based Logistics strategy for incorporation into brigades that receive SO technologies/capabilities
- Coordinate and facilitate the integration of Spinout and Program of Record Systems into Current Force BCT through a rigorous **Systems Engineering process**







# Innovative Spinout Management Strategy



**PM Spin Out/LSI**  
SO content focus  
COL Chris Deluca

**PM Modular Brigade Enhancements**  
Fielding focus  
COL Ray Jones

## Management Approach

- Tri-Chair Led Program Management Reviews
- SE based Program Management (SEP to be developed)
  - *Integrated Master Schedule*
  - *Risk Management tracking*
- Leveraging each other organizations
- Close interface with all SO organizations
- PM FCS(BCT) and PEO GCS closely aligned
- Spin Out Integration Board (SIB) controlling SO content
- Mutual planning on all SO major milestones through BLRIP
- One Face to the Warfighter

*Acquisition Excellence*

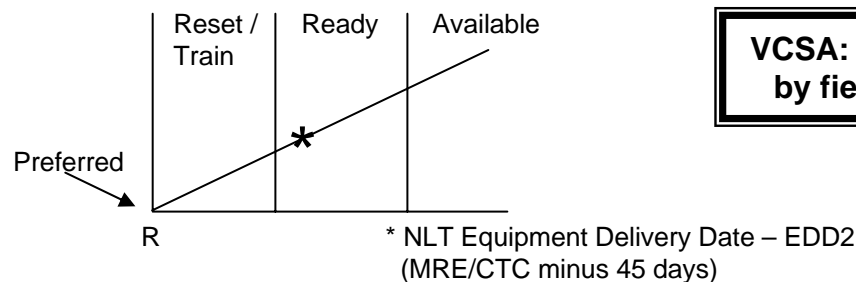





# Synchronizing Spin-Outs with ARFORGEN

## Army's Operational Priorities

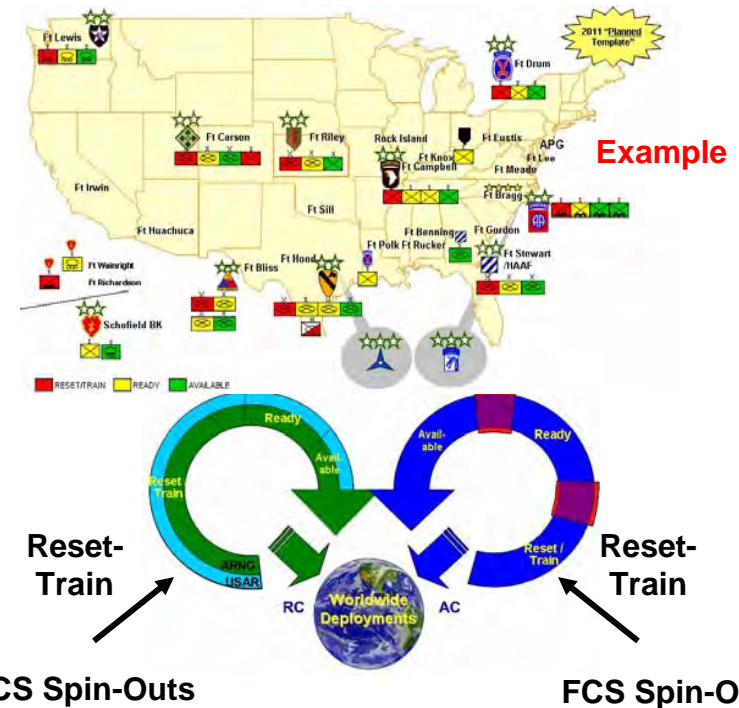
- Network, U-UGS, T-UGS, IMS, NLOS-LS
- Field the highest-payoff FCS spin-out systems to as many BCTs as fast as possible
- Intent is for all BCTs to receive FCS sensors and common network capabilities



**VCSA: “No drive by fieldings!”**

## Concept for Fielding FCS Spin-Outs

- Field FCS spin-outs to BCTs in the Reset/Train force pool  
Rationale: quality unit training with new ISR and network battle command capabilities significantly improves the payoff during operational employment
- Include ARNG, APS and Theater Equipment
- Revisit fielding FCS spin-outs to units until all BCTs have received Spin-Out 4 capabilities or converted
- Continue fielding FCS spin-outs simultaneously with FCS unit conversions



**FY 10** Reset/Train Group 1 receives Spin 1  
**FY 11** Reset/Train Group 2 receives Spin 1  
**FY 12** Reset/Train Group 3 receives Spin 1/2

**FY 13** Reset/Train Group 1 receives Spin 1/2  
**FY 14** Reset/Train Group 2 receives Spin 1/2/3  
**FY 15** Reset/Train Group 3 receives Spin 1/2/3

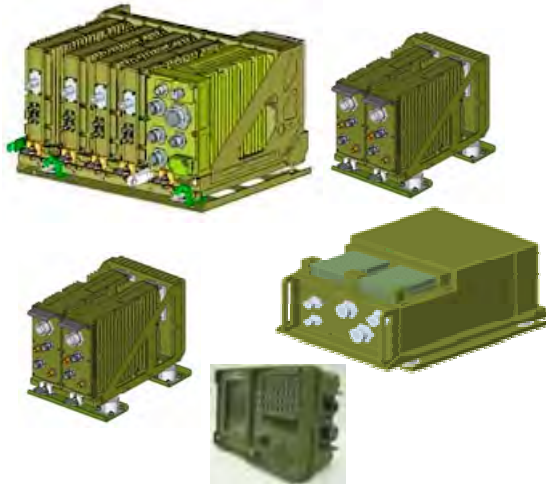
**FY 16** Reset/Train Group 1 receives Spin 1/2/3/4  
**FY 17** Reset/Train Group 2 receives Spin 1/2/3/4  
**FY 18** Reset/Train Group 3 receives Spin 1/2/3/4



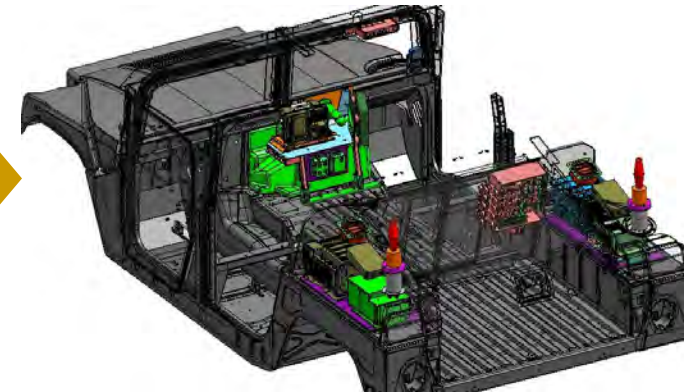


# A/BKit Integration Example

## Standard SO1 BKit



Currently only focusing on one tactical vehicle variant AKit design to support the SO1 LUT



- Challenge: Specific configurations of tactical vehicle variants vary from brigade to brigade
- Path Forward: Designing a standardized A/BKit to fit multiple tactical vehicle variants and configurations







# The Challenge

- Synchronize multiple programs across multiple organizations
- Synchronize acquisition strategy with standup of Evaluation Brigade Combat Team
- Align Life Cycle Management Command (LCMC) processes with capability based acquisition
- Develop a single Army Integrated Master Schedule and Plan to manage spin out
- Develop a process to manage, report, and predict integrated capabilities vs. program metrics
- Establish a budget and contract structure that supports capability management vs. individual project management
- Organize a program office that acts and thinks in terms of capability management (Break the “Stovepipes”!)



# 2006 Combat Vehicles Conference

Current to Future...Future to Current

*The HBCT*  
*"Back for the Future"*

24 October 2006

Larry Hollingsworth  
Colonel, Infantry  
Project Manager



***Make A Difference Everyday!***





## Purpose

**How we Know we're Back**

**PM HBCT Priorities and Fleet Strategy**

**Modularity**

**Supporting the Fight**

**Army Forces Generation Model**

**The Future**





**Heavy Brigade Combat Team**



## Mission

### **Deliver, Sustain and Modernize Combat Power for the Army's Heavy Brigade Combat Team Formations**

Army's Life Cycle Manager for the **Abrams, M88, Bradley, M113, M109, and Knight** family of vehicles. Our responsibilities include the **design, development, production, fielding** and **sustainment** of **safe, reliable, and lethal** ground combat systems

*Our current focus supports **Deployed Forces, HBCT ARFORGEN Cycles, Modularity, Sustainment of Leave Behind & Theater Provided Equipment (LBE & TPE), RESET, Recapitalization and Spin-Out Technology** for each platform fleet both today and the future*

**Support the Fight \*\* Sustain the Fleet \*\* Build the Future**





## Heavy Brigade Combat Team



# Systems We Manage

8,325  
Abrams FoV



3,962  
Fire Support  
Platforms



13,943 M113  
6,452 Bradley



100 in Active Use 4





# Additions To The Formation







## Current Priorities

**Support HBCTs in the Fight, and those preparing to Deploy**

**Execute 4ID/1CD Swap & associated Mission Essential Tasks**

**Execute the Condition Based Maintenance Demonstration (COBRA) Develop Vehicle Health Management Strategy**

**Posture to support the EBCT and Future Combat System**

**Pursue Process Improvement**

**Execute PM HBCT ARFORGEN Support Cycle**

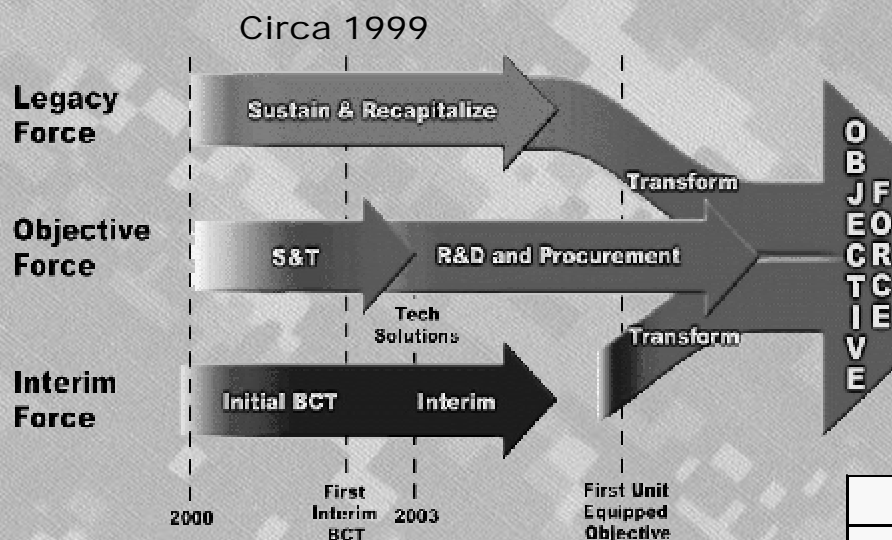




## Heavy Brigade Combat Team



# Where We Were...



- **An Army at Peace**
- **Assumed Risk with Current force**
- **Sustain versus Modernize**
- **Deliver FCS in 2008**
- **Centered on Divisions versus BCTs**
- **Divest versus Invest**
- **Aging Fleet**

### PM Combat Systems Funding

| APPN        | FY07  | FY08  | FY09  | FY10 | FY11 | Total  |
|-------------|-------|-------|-------|------|------|--------|
| RDTE        | 13.1  | 8.7   | 6.6   | 0    | 0    | 28.4   |
| Procurement | 477.2 | 441.7 | 337.3 | 110  | 103  | 1469.2 |
| OMA         | 116   | 56    |       |      |      | 172    |
| Total       | 606.3 | 506.4 | 343.9 | 110  | 103  | 1669.6 |

FY05 President's Budget, dtd., Jan 04 \$M

DEPARTMENT OF THE ARMY  
OFFICE OF THE ASSISTANT SECRETARY OF THE ARMY  
PROGRAMS, LOGISTICS AND TECHNOLOGY  
WASHINGTON, DC 20315

11 MAR 2003

SAAL:R

MEMORANDUM FOR PROGRAM EXECUTIVE OFFICE, GROUND COMBAT SYSTEMS, ATTN: SFAE-GCS, WARREN, MI 48397-5000

SUBJECT: Fiscal Year 2003 (FY03) Termination Plans for Abrams SEP and Bradley A3 Programs

As stated in the enclosure, the Assistant Secretary for Plans, Programs, and Resources, memorandum dated Fiscal Year (FY) 2003 Funding Guidance, dated September 10, 2000, fiscal year 2003 funding guidance resulted in multiple terminations during the current Objective Memorandum (OM) FY04-05, including the Abrams SEP and Bradley A3 Programs. Accordingly, please prepare and submit individual termination plans for the Abrams SEP and Bradley A3 Programs. Do not terminate contracts until I have approved your submitted termination plans. I will provide an official termination notice.

You are directed to provide the program manager with a copy of each termination plan, you will identify:

- Contract status. Open contracts, open contracts with options, and contract related responsibilities per contract. Address termination and/or modification of existing contracts and unliquidated obligations. Identify the final date to terminate the program.
- Sustaining requirements. If the terminated program has sustaining activities (SSTs) and funding, ensure the program is coordinated with the gaging organization to which management transferred.
- Personnel. Include proposed disposition of all personnel (civilian and personnel involved in the termination, including those completing of current activities and those available for reassignment).
- Funding. Provide a layout of RDTE, Procurement, and OMA (as applicable) as submitted in the FY04 President's Budget. Portray how be executed for terminating the program. Identify the obligation (unliquidated activities/obligations) required to execute the funds. Identify the required, in FY03 dollars, to terminate the program.

Other significant events/activities, which must be completed prior to termination (i.e., testing, safety issues, material issues, etc.). If the termination of technology and/or responsibilities, please incorporate these into the termination plan has been appropriately coordinated.

1. A termination schedule identifying significant activities and events.

Additionally, you should be prepared to consolidate and archive relevant documentation, and determine the actions and requirements necessary program in the event this becomes necessary. Submit your termination plan to the Deputy Assistant Secretary for Plans, Programs and Resources.

Please accept and extend my appreciation to the Program Manager for their continued hard work and commitment to excellence. The Army's finest, the warfighters, have been, and will continue to be, supported with state of the art equipment.

**"SUBJECT: Fiscal Year 2003 (FY03) Termination Plans for Abrams SEP and Bradley A3 Programs"**

**..... Please prepare and submit individual termination plans for approval.**

**"Legacy versus Current"**





# Heavy Brigade Combat Team



## Where We Are...

**Vision:** Relevant and Ready Landpower in Service to the Nation

**Mission:** Provide necessary forces and capabilities to the Combatant Commanders in support of the National Security and Defense Strategies

Four Overarching, Interrelated Strategies



**Support Global Operations**  
Adapt and Improve Total Army Capabilities  
Optimize Reserve Component Contributions  
Sustain All Volunteer Force  
Adjust Global Footprint  
Build the Future Force  
Adapt Institutional Army  
Develop Joint, Interdependent Logistics Structure

**More Relevant & Ready**  
• More Capable & Modern  
• More Stable & Predictable

**Army Campaign Plan DP 41**  
JCIDs Process  
Modularity (BCT Structure)  
National Level RESET  
FCS Synchronization  
BCT Modernization  
TRADOC Guidance

**Doctrine**  
Hunter Killer  
Complementary Capability  
Enemy Overmatch  
Leverages HBCT and Platform Capabilities

**THIS ARMY THIS DECADE**

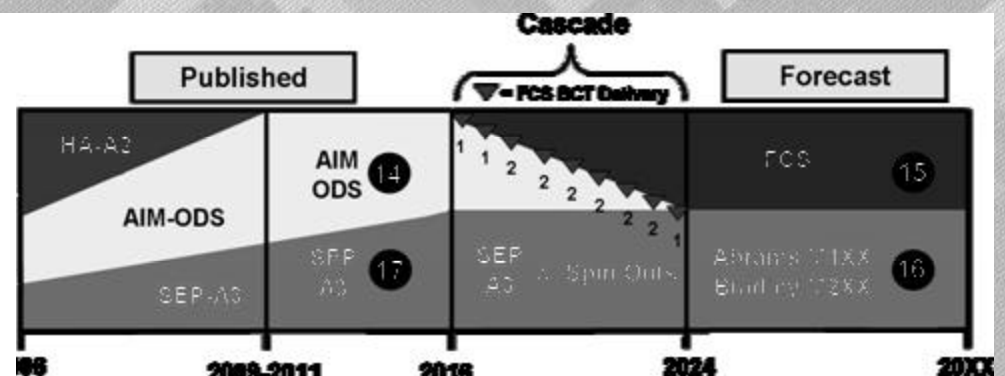
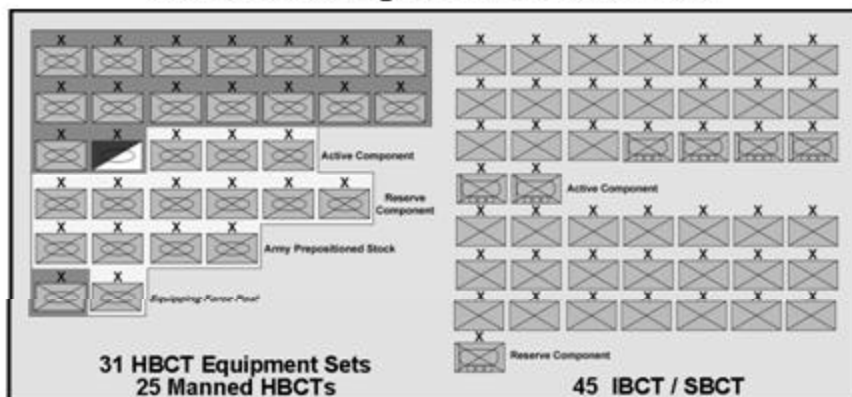
**A Campaign Quality Army with Joint and Capabilities**

**Winning NOW to Increase Combat Power**

**CSA's Priorities**  
Win the Long War while sustaining the All-Volunteer Force  
Accelerate the Future Combat Force Strategy  
Accelerate Business Transformation and Process Improvements

| PM Heavy Brigade Combat Team |  |      |      |      |      |      |      |      |      |
|------------------------------|--|------|------|------|------|------|------|------|------|
| APPN                         | FY05   | FY06 | FY07 | FY08 | FY09 | FY10 | FY11 | FY12 | FY13 |
| RDTE                         | <b>Total Program Funding:</b><br><b>28.7 Billion</b> |      |      |      |      |      |      |      |      |
| Procurement                  |  |      |      |      |      |      |      |      |      |
| OMA                          |  |      |      |      |      |      |      |      |      |
| Total                        | 3054   | 2712 | 6911 | 2532 | 3240 | 2871 | 3032 | 2461 | 2741 |

**PM HBCT is the Life Cycle Manager for about 40% of the Army's BCT Combat Power**



**"HBCTs are Part of our Future"**

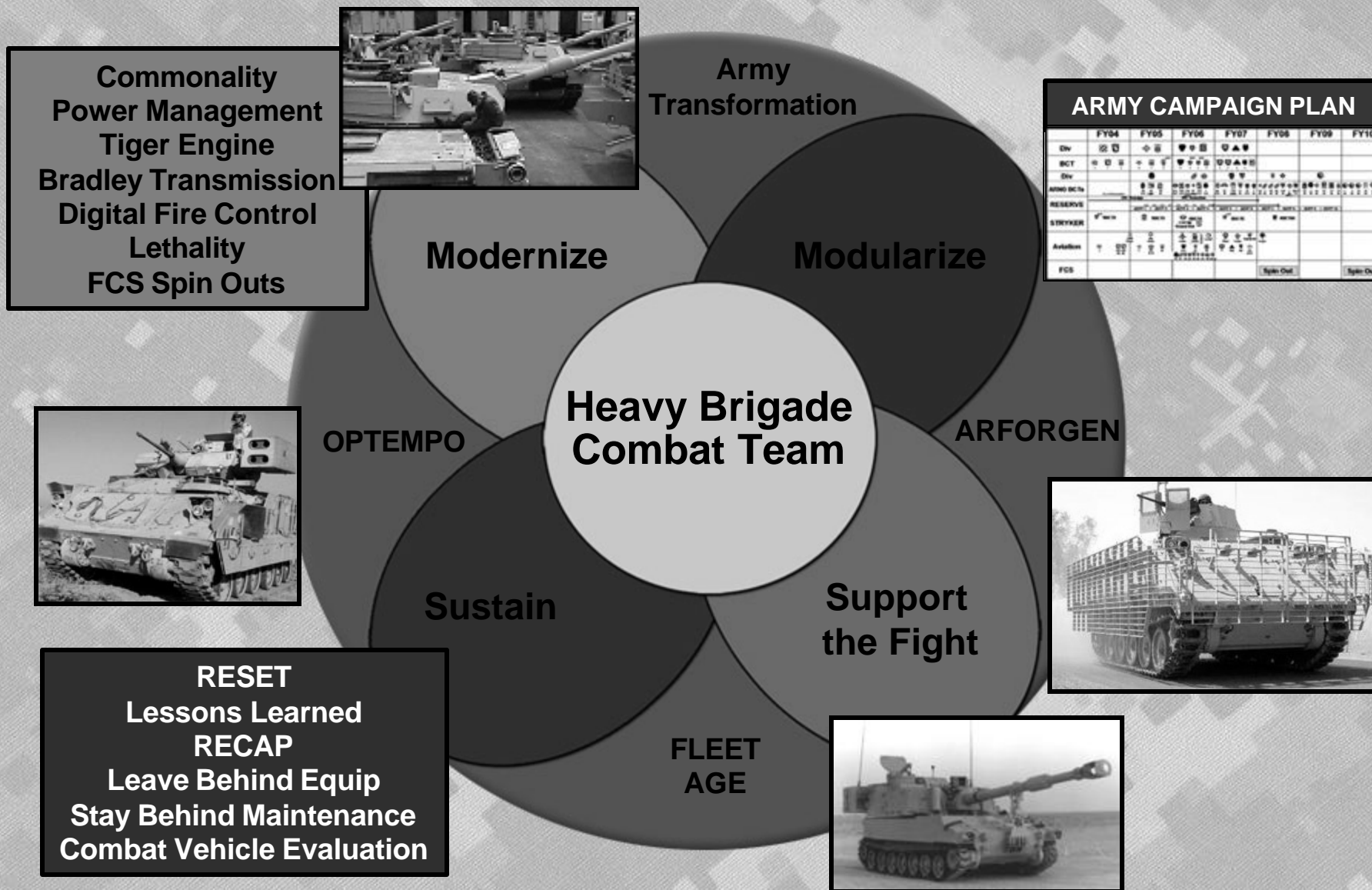




# Heavy Brigade Combat Team



## HBCT Fleet Strategy







***Heavy Brigade Combat Team***



# Modularity



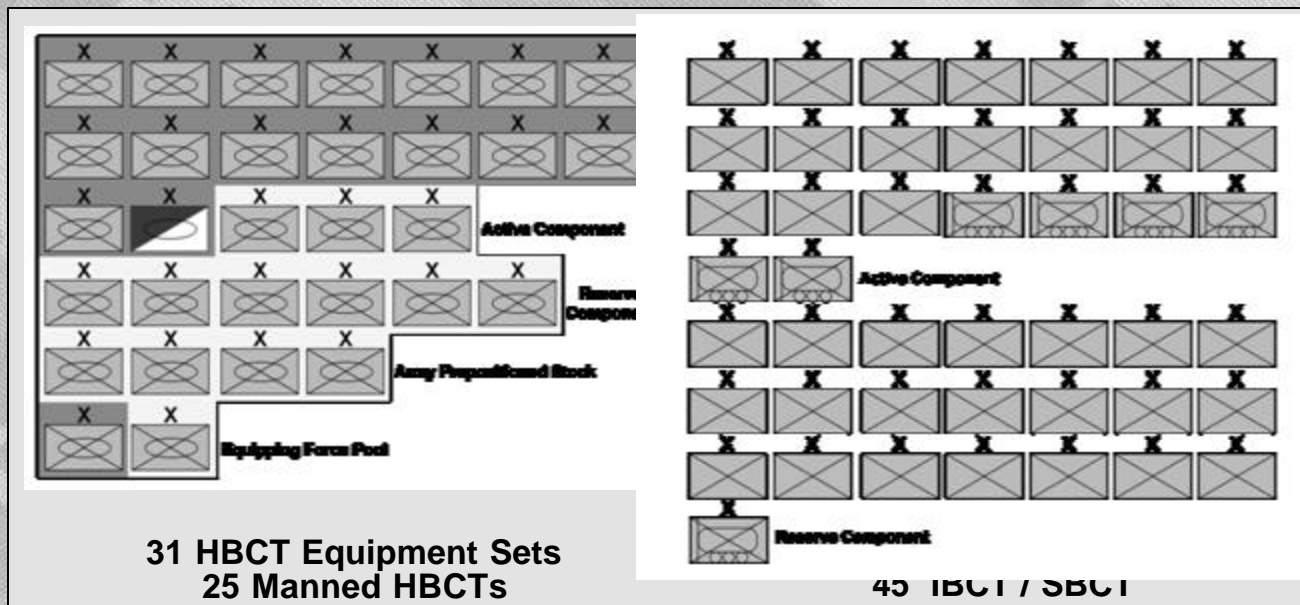




# Bottom line...

**PM HBCT is the Life Cycle Manager for about 40% of the Army's BCT Combat Power**

|               |
|---------------|
| 17<br>SEP-A3  |
| +             |
| 14<br>AIM-ODS |
| =             |
| 31<br>HBCT's  |



## Responsibilities Include:

- Deliver Combat Overmatch through Lethal Survivable Systems
- Modernize HBCTs
- Sustain:
  - Reconstitution
  - Recapitalization
  - Remanufacture
  - RESET
  - Modify
  - Upgrade
- Modernize
- Maintain Operator and Maintenance Training Devices
- Maintain Interoperability between Systems and with FCS BCT



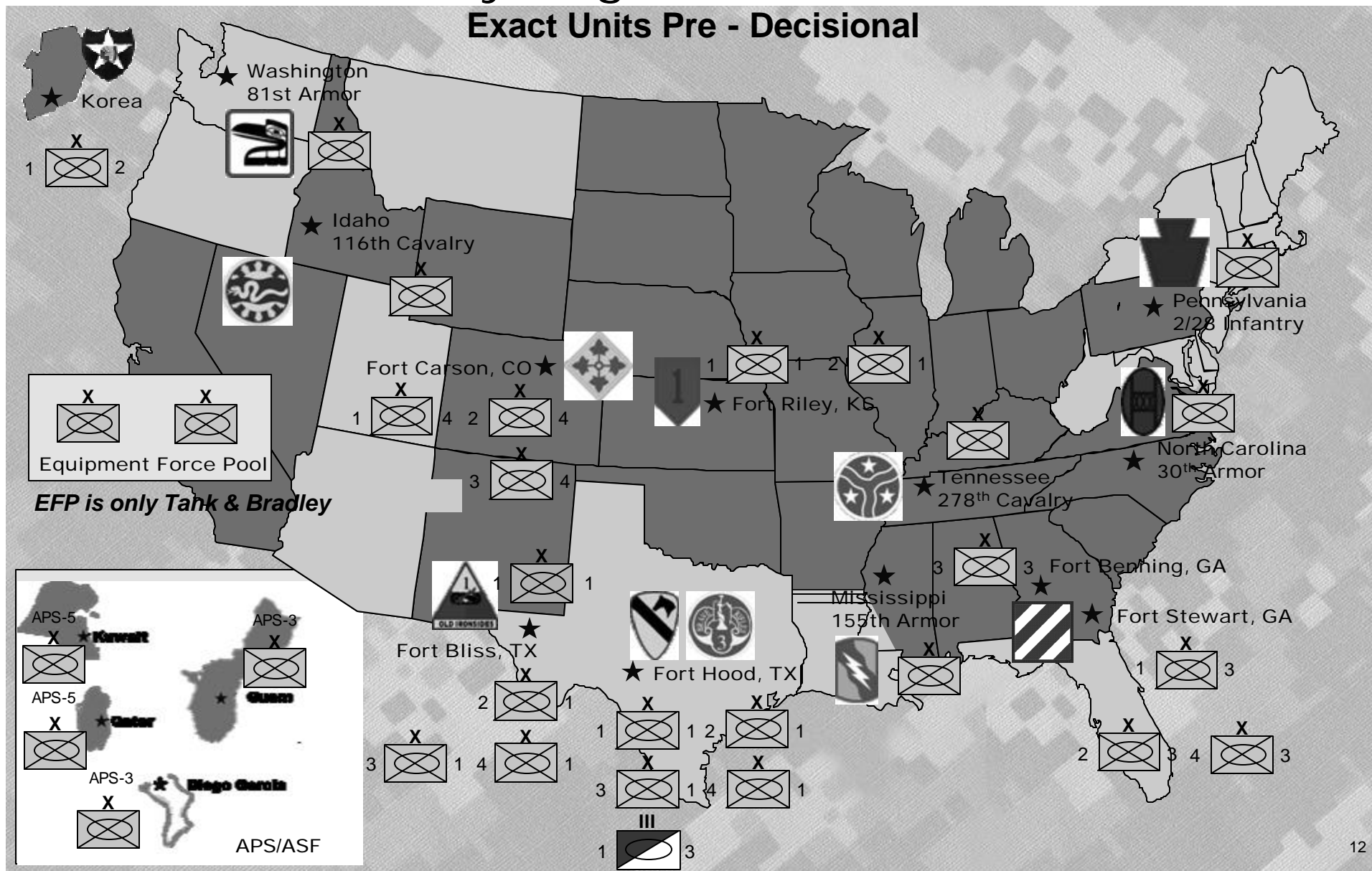


## Heavy Brigade Combat Team



# 31 Heavy Brigade Combat Teams

Exact Units Pre - Decisional



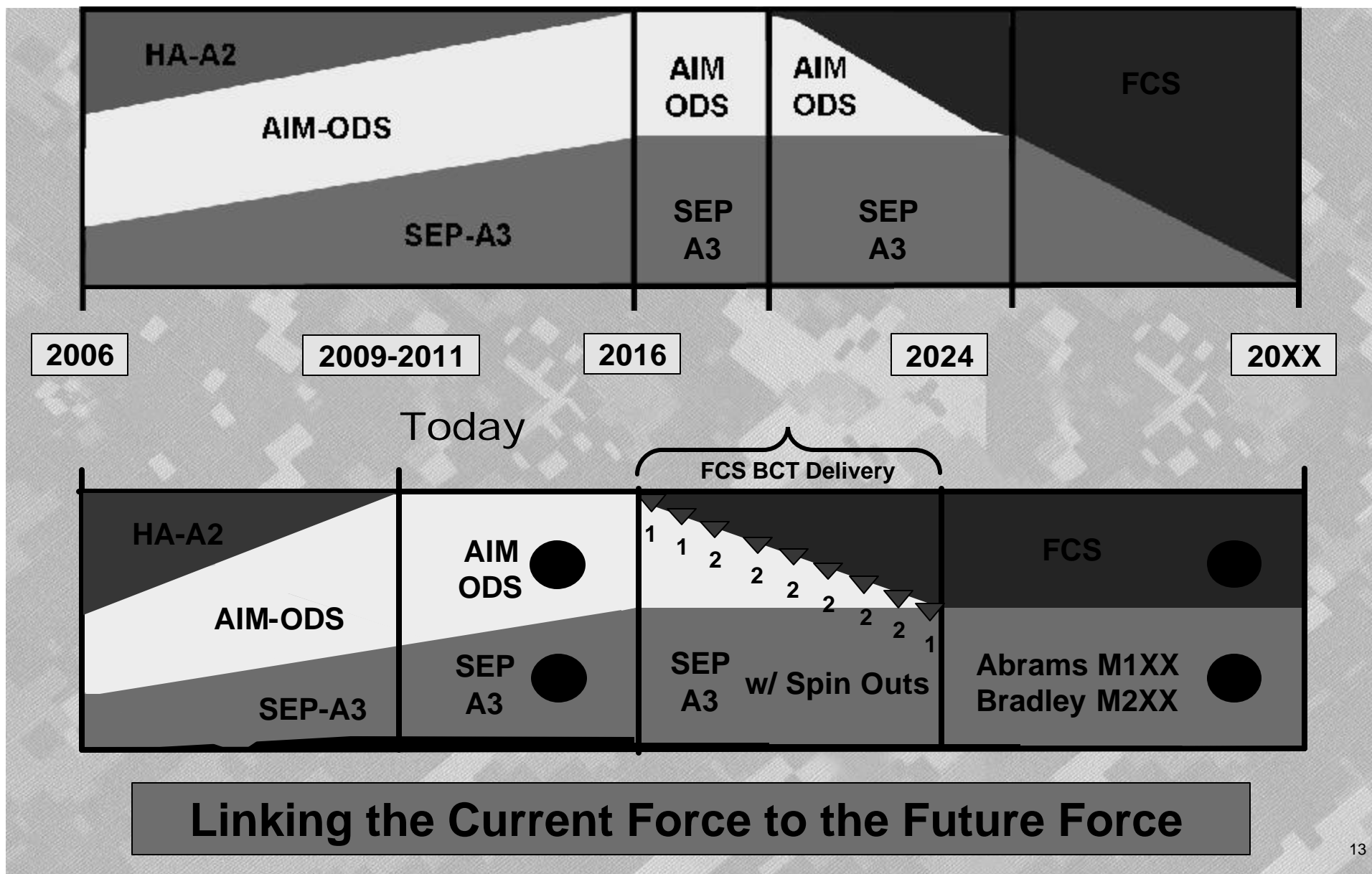




## Heavy Brigade Combat Team



-- A Year Ago







***Heavy Brigade Combat Team***



# Support the Fight

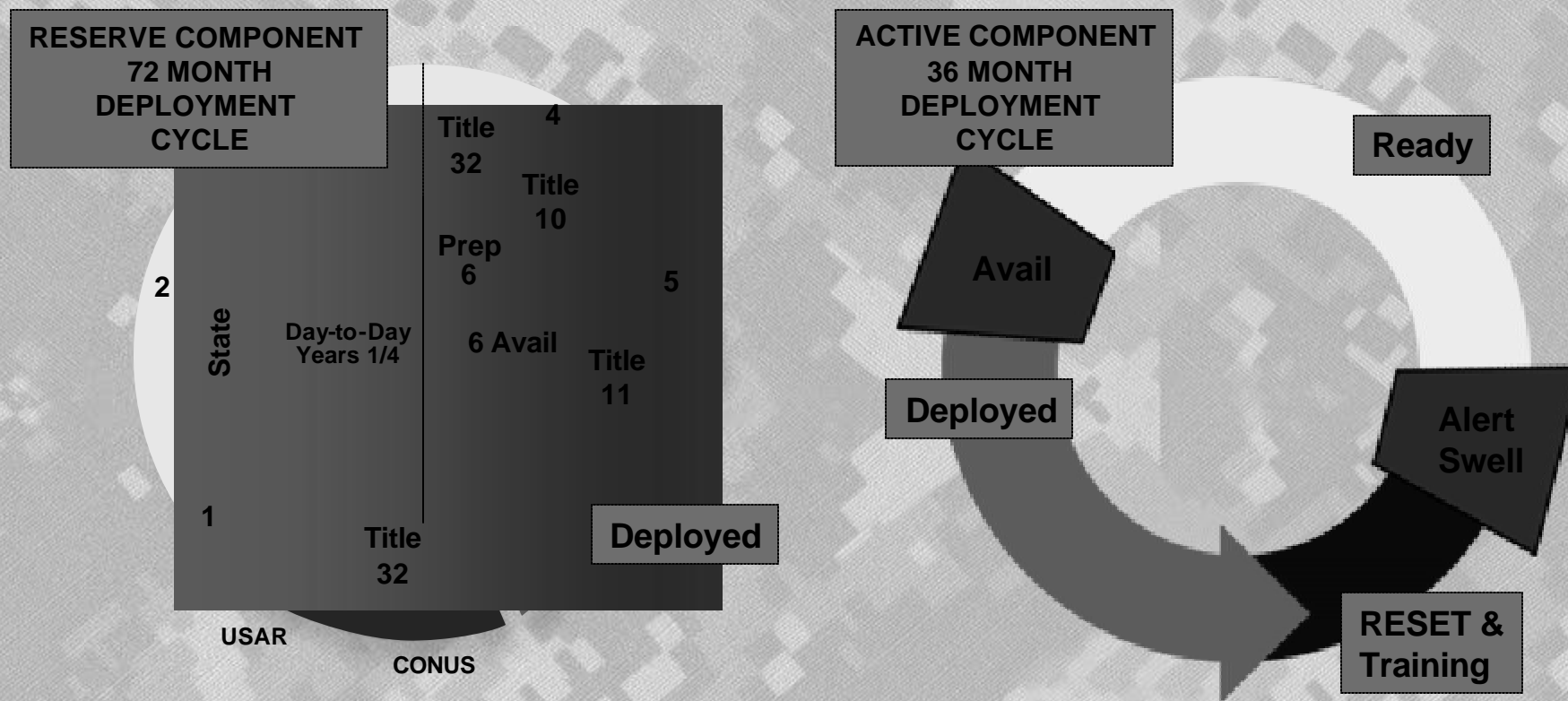






# Army Forces Generation Model

## ARFORGEN



**Synchronizes the Right Force Mix with the Right Equipment Mix  
at the Right Time**

**PM Objective is to "ONLY TOUCH THE UNIT ONCE"**



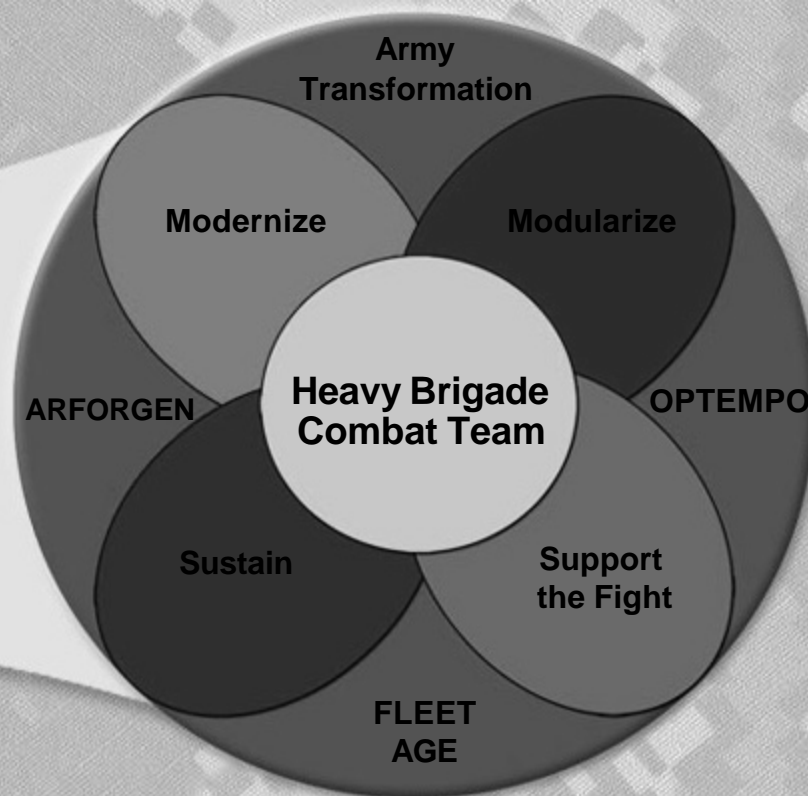
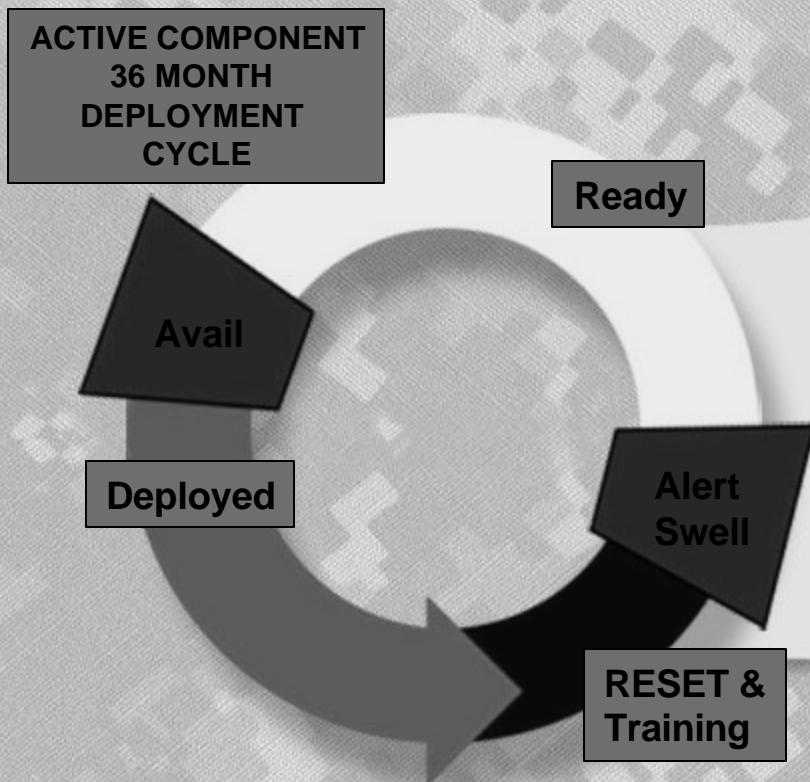


## Heavy Brigade Combat Team



### ARFORGEN

### HBCT Fleet Strategy



### Notional Unit Cycle

Active Army one Deployment in three year cycle  
Reserve Component one Deployment in six year cycle





# ARFORGEN Support Cycle

## Touch Points Overview



**Five Critical Interactions between PM HBCT, Divisions and HBCTs**





## Heavy Brigade Combat Team



# ARFORGEN is a BCT Planning Tool (31 HBCT)



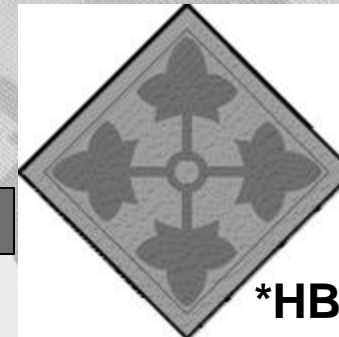
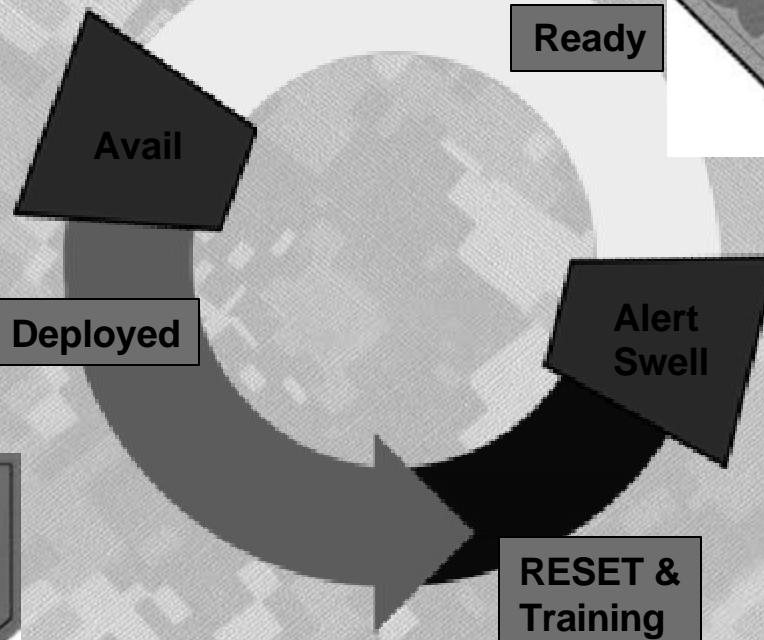
EBCT x 4



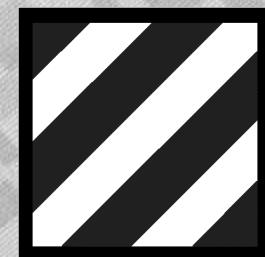
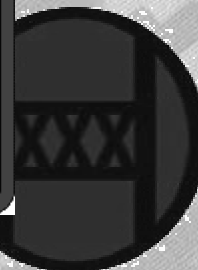
HBCT x 2



RC = HBCT x 6  
(notional Units)



\*HBCT x 9



HBCT x 4

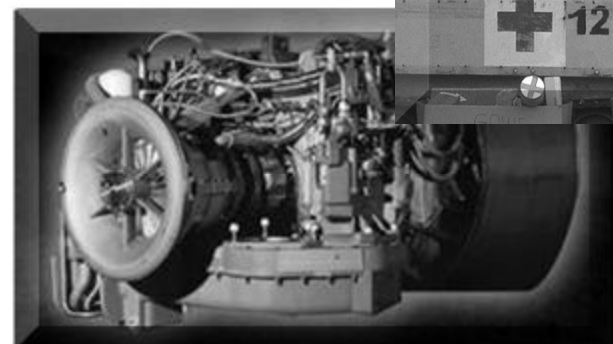
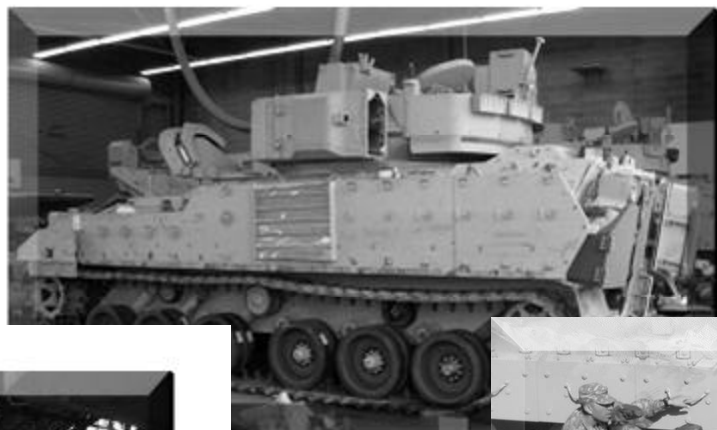
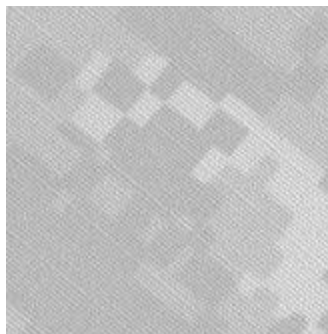




***Heavy Brigade Combat Team***



# Sustain the Fleet







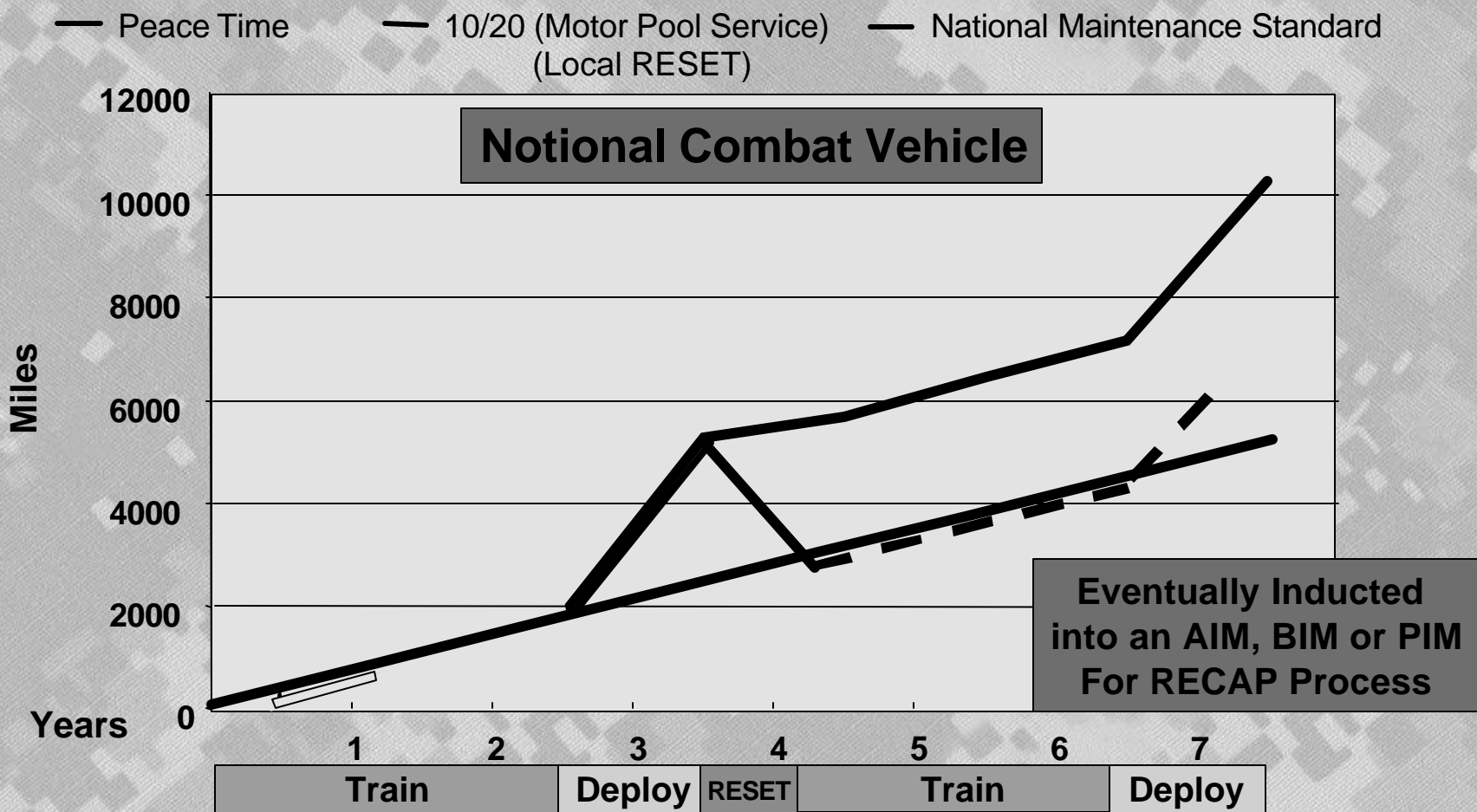
## National Level RESET

Work performed to correct equipment faults that are above the Field level of maintenance (that is, above ORG and DS), as laid out in Technical Manual Maintenance Allocation Charts. National level Reset is orchestrated by AMC, performed to a National standard that AMC is responsible for defining, and could be done in the Army Materiel Command, by contractor, by installation DOL maintenance activities, or any combination of the three. It is conducted in depots, arsenals and forward on or near installations where the equipment is stationed. The AMC life cycle management centers (LCMCs) develop strategies for National Level maintenance ICW their PEO/PM (LCMCs include PEO/PMs) partners and IMA (for work done by DOLs). National level Reset can also be performed on pieces of equipment which exceed Field level Reset capability because of the quantity, aggregate labor in a given unit and/or complexity of work to be performed. [Certain types of equipment, delete between <><due to its inherent complexity> will automatically be done at the National level of maintenance. Aviation STIR and the Generator Reset program are examples. AMC and MACOM agreed to items are selected for automatic RESET, and AMC publishes a list of equipment which is treated in this manner.





# Goals for National Level RESET



- Peace Time OPTEMPO is 800 Miles/Year
- Abrams and Bradley Mileage in SWA is 5000 - 8000 Miles





# Recapitalization

Rebuild, Reman and/or Systemic Upgrade of systems in our inventory to *ensure Operational Readiness and a zero time/zero mile system*. To PM HBCT the primary purpose of RECAP is build sufficient current configuration assets to achieve the Modular End State. Traditionally RECAP objectives include; extending service life, reducing O&S costs, improving system reliability, and enhancing capability. For us RECAP is taking an old configuration system and *delivering an upgraded system to the fleet*. RECAP occurs at the National Level of Maintenance and is done in an AMC Depot/Arsenal, by the OEM or a Partnership of the two. RECAP is managed by PMs as part of AMC LCMCs

**Upgrading Existing Systems to Deliver Current Configuration Combat Platforms to achieve the Modular Fleet End State**

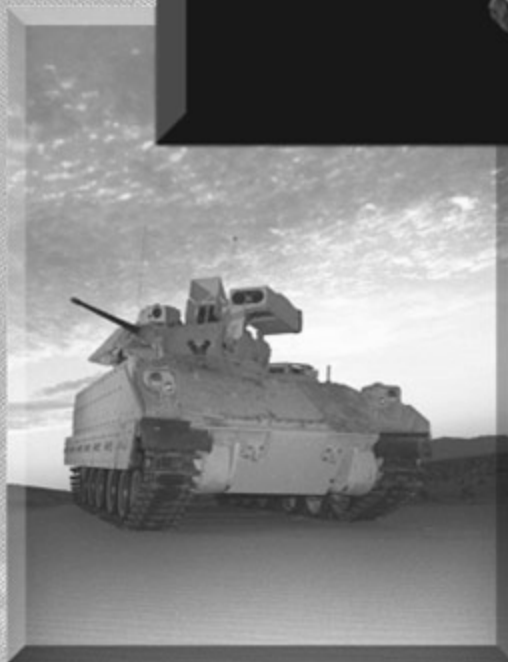




***Heavy Brigade Combat Team***



# Modernize the Fleet

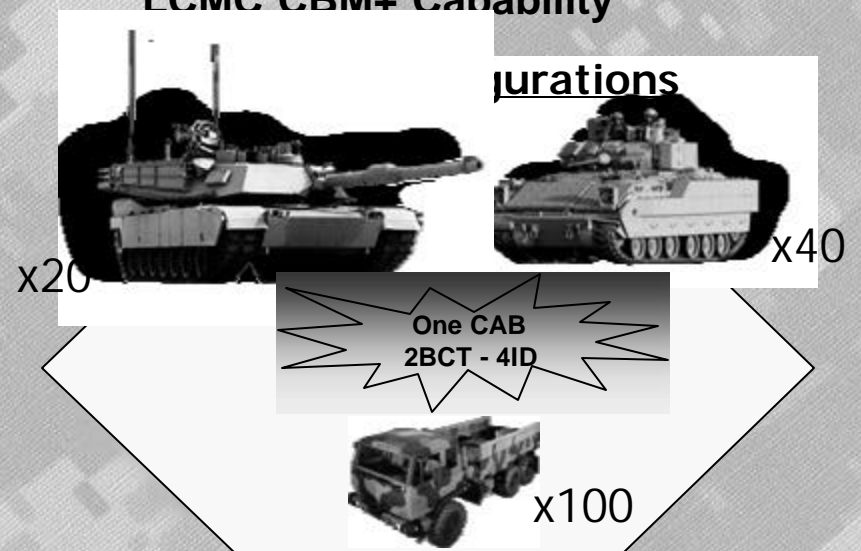






## Conditioned Based Maintenance Reliability Assessment (COBRA)

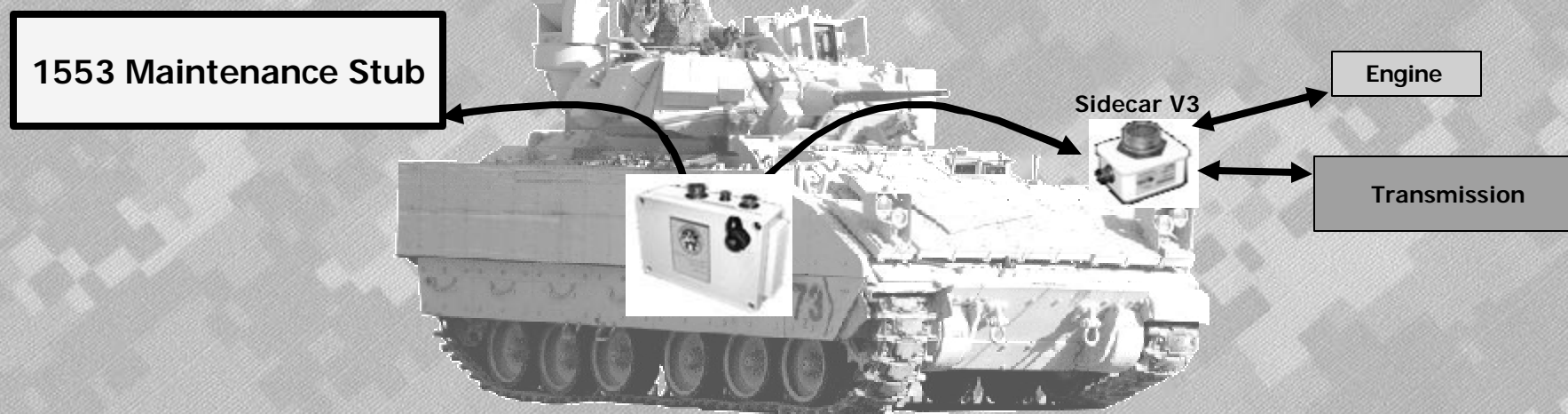
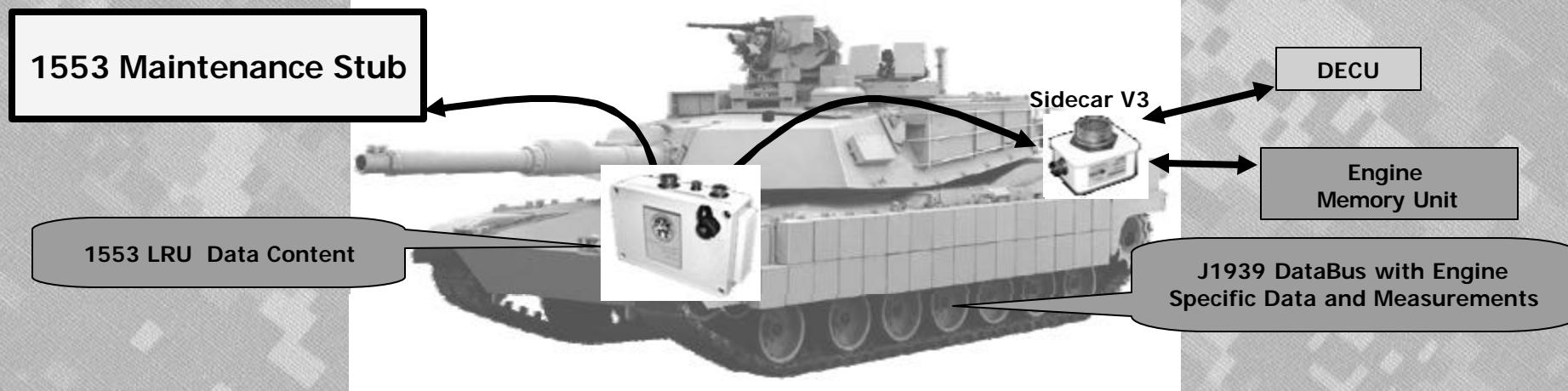
- Functional Data from an Operational Unit
- Additional Platform Sensed Parameters
- Autonomous Data Collection, Storage, and Transmission
- Enable Configuration Management (ID Tagging)
- Logistics and Maintenance Situational Awareness (SA)
  - On and Off Vehicle
- Maintenance and Log Analytical Tools and Reports
- Standing Up Developmental Platform
- Risk Reduction with Fort Knox Fielding
- Supports Development of FCS Interoperability and CLOE
- Establishes the Foundation for the LCMC CBM+ Capability







## M1A2 SEP/M2A3 Configuration







## FCS SPIN OUTS

### Spin Out 4

**Hardware**  
JTRS Cluster 1 Radio  
Integrated Computer System  
RF and Cables

**Software**  
SOSCOE  
Battle Command  
Network Management

**FCS Systems/Platforms**  
UGVs  
T-UGS and U-UGS

### Spin Out 3

**Hardware**  
JTRS Cluster 1 Radio  
Integrated Computer System  
RF and Cables

**Software**  
SOSCOE  
Battle Command  
Network Management

**FCS Systems/Platforms**  
UGVs  
T-UGS and U-UGS

### Spin Out 1

**Hardware**

- Ground Platform Comms System
- Integrated Computer System

**Software**

- SOSCOE
- Battle Command
- Network Management

**FCS Systems/Platforms**

- T-UGS & U-UGS
- IMS
- NLOS-LS

### Spin Out 2

**Hardware**

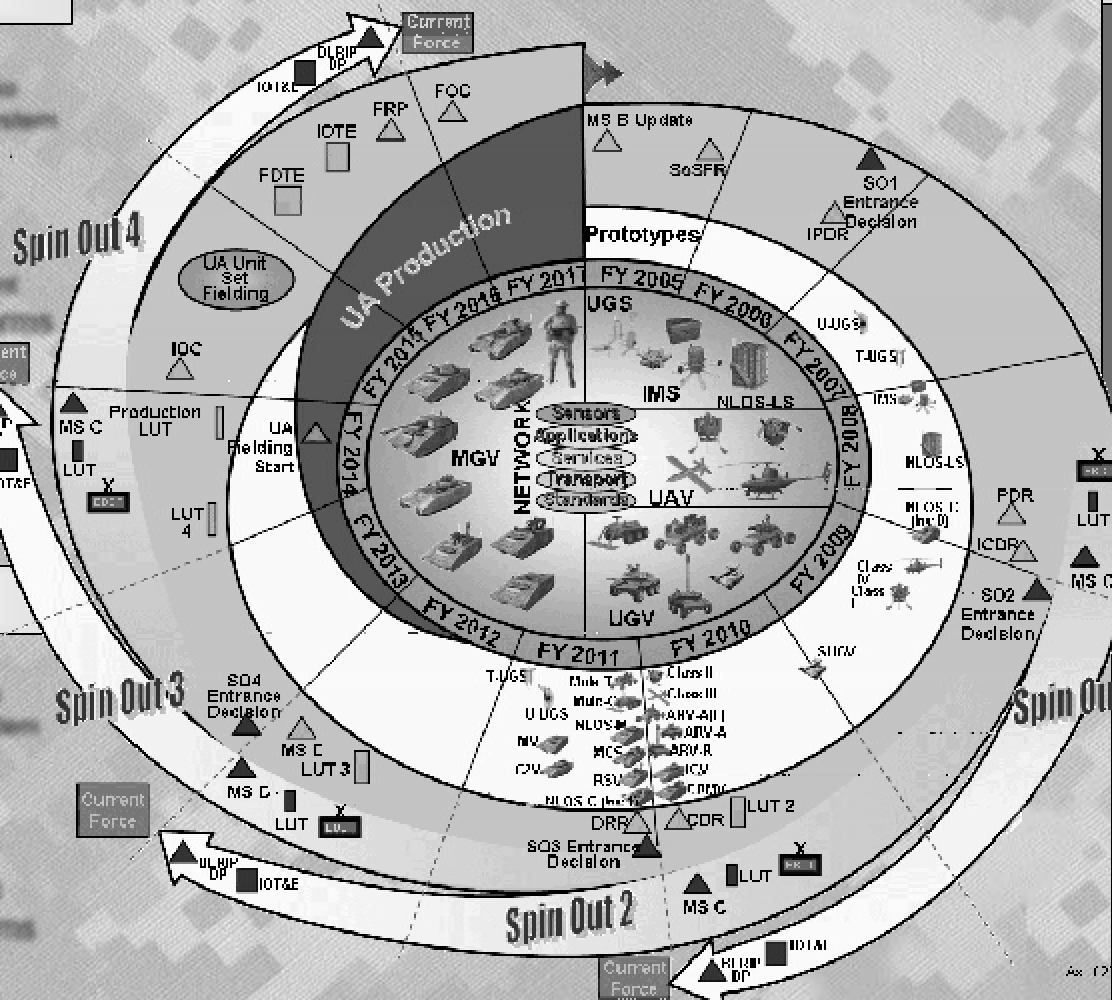
- Ground Platform Comms System
- Integrated Computer System

**Software**

- SOSCOE
- Battle Command
- Network Management

**FCS Systems/Platforms**

- UGVs
- T-UGS & U-UGS
- IMS
- NLOS-LS







**Heavy Brigade Combat Team**



# Modernization *Commonality*

## **Mobility**

*Power Train  
Suspension  
Track*

## **Situational Awareness**

*Next Gen FLIR  
FBCB2  
BFT  
DVE  
360° SA*

## **Survivability**

*APS  
Seats  
CREW II  
DVE  
Gun Shields*

## **Common Focus**

*Power Mgmt  
Spin Outs  
LRU Consolidation  
Thermal Mgmt  
Embedded Training*

## **Vehicle Health**

*CM/ED  
Cobra  
TMDE*

## **Lethality**

*Next Gen Ammo  
Common Weapon  
Stations*

**Commonality Opportunities - Technologies, Products & Components**





## Summary

**PM HBCT is the LCM for about 40% of BCT Combat Power**

**HBCTs are integral to the Current and Future Army Force**

**M2A3 and M1A2 Represent the EBCT Platforms for FCS  
Spinouts 1-4**

**Transformation must include a Current Force Modernization  
Strategy that Compliments FCS**

**Commonality is the Center of Gravity for HBCT Modernization**



# Marine Corps Resetting the Forces



Presented by: Carla B. Johnson

24 October 2006

*Logistics Solutions for the Warfighter*





# Mission Statement

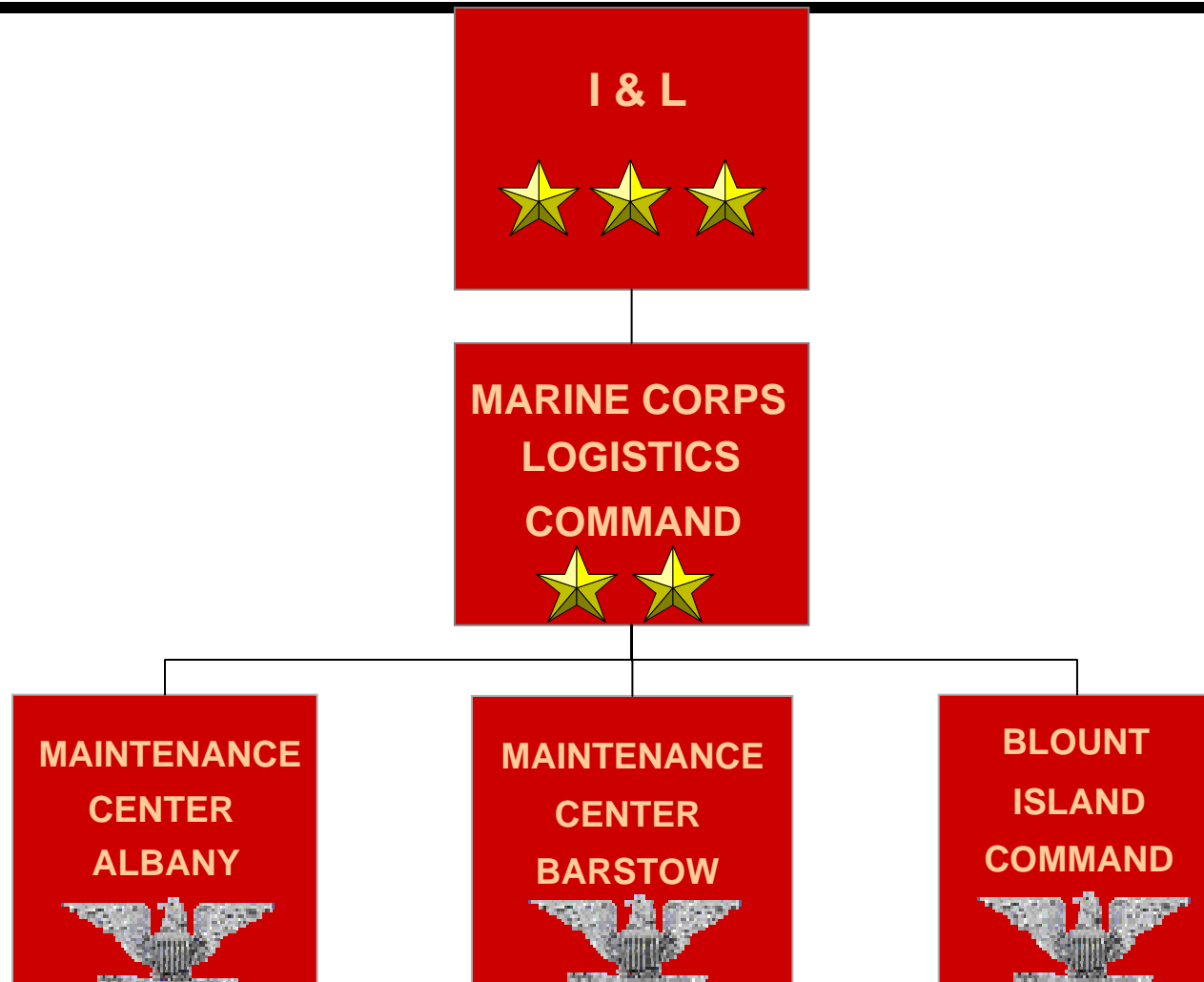
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**"To provide worldwide, integrated logistics/supply chain and distribution management; depot level maintenance management; and strategic pre-positioning capability in support of the operating forces and other supported units to maximize their readiness and sustainability and to support enterprise and program level Total Life Cycle Management."**



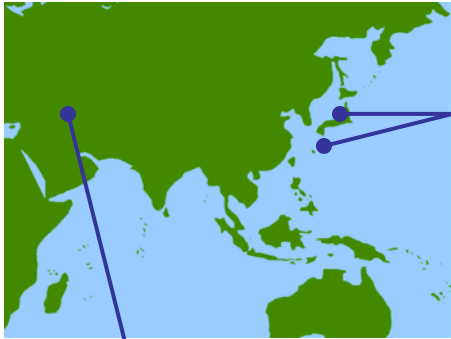


# Organization



*Logistics Solutions for the Warfighter*

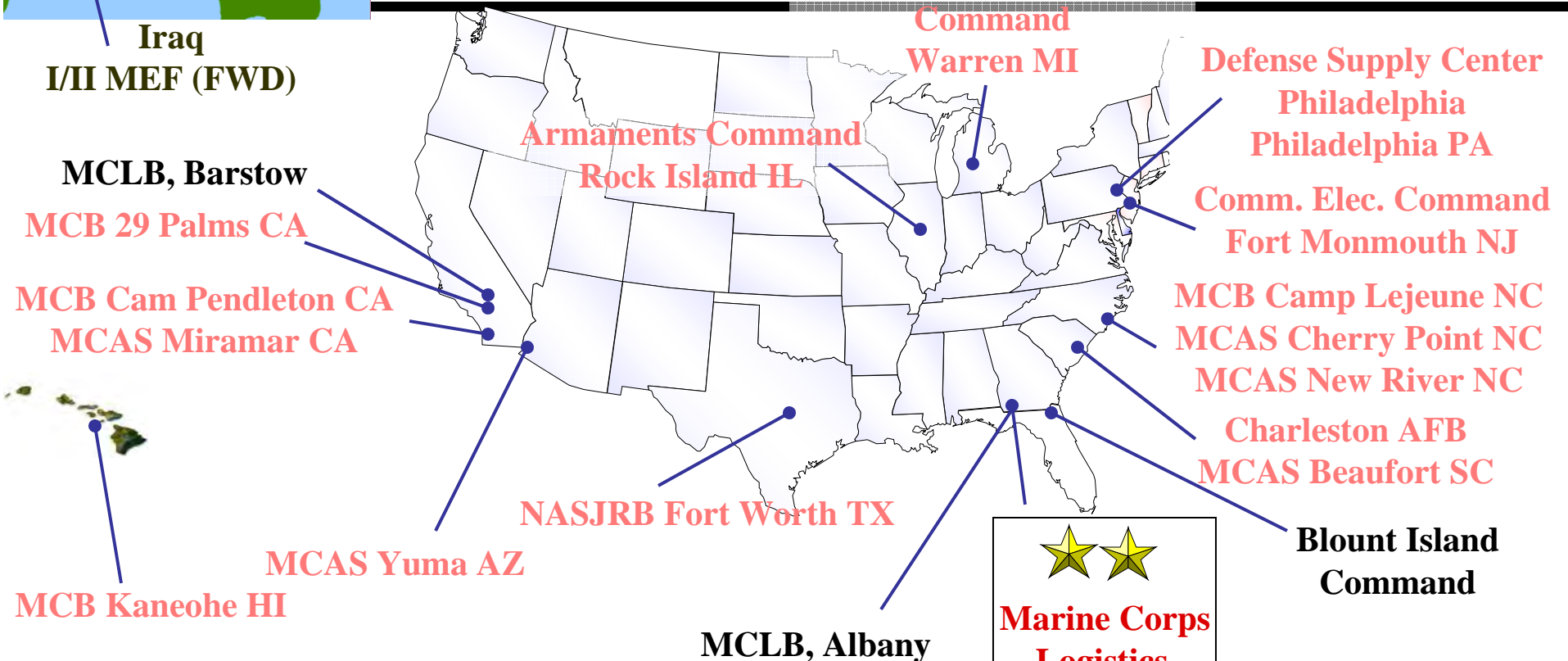




Camp Kinser Okinawa  
Camp Foster Okinawa  
Camp Schwab Okinawa  
Camp Hansen Okinawa  
MCAS Iwakuni Japan

# Locations

## Tank & Automotive



SCMC (CIFs, NBCD EAU, RIPs, Distribution LnO)



Forward Deployed Liaison Officers

*Logistics Solutions for the Warfighter*





# Core Competencies

- Supply Chain Management
- Strategic Prepositioning
- Depot-level Maintenance
- Contract Management



*Logistics Solutions for the Warfighter*





# Supply Chain Management

---

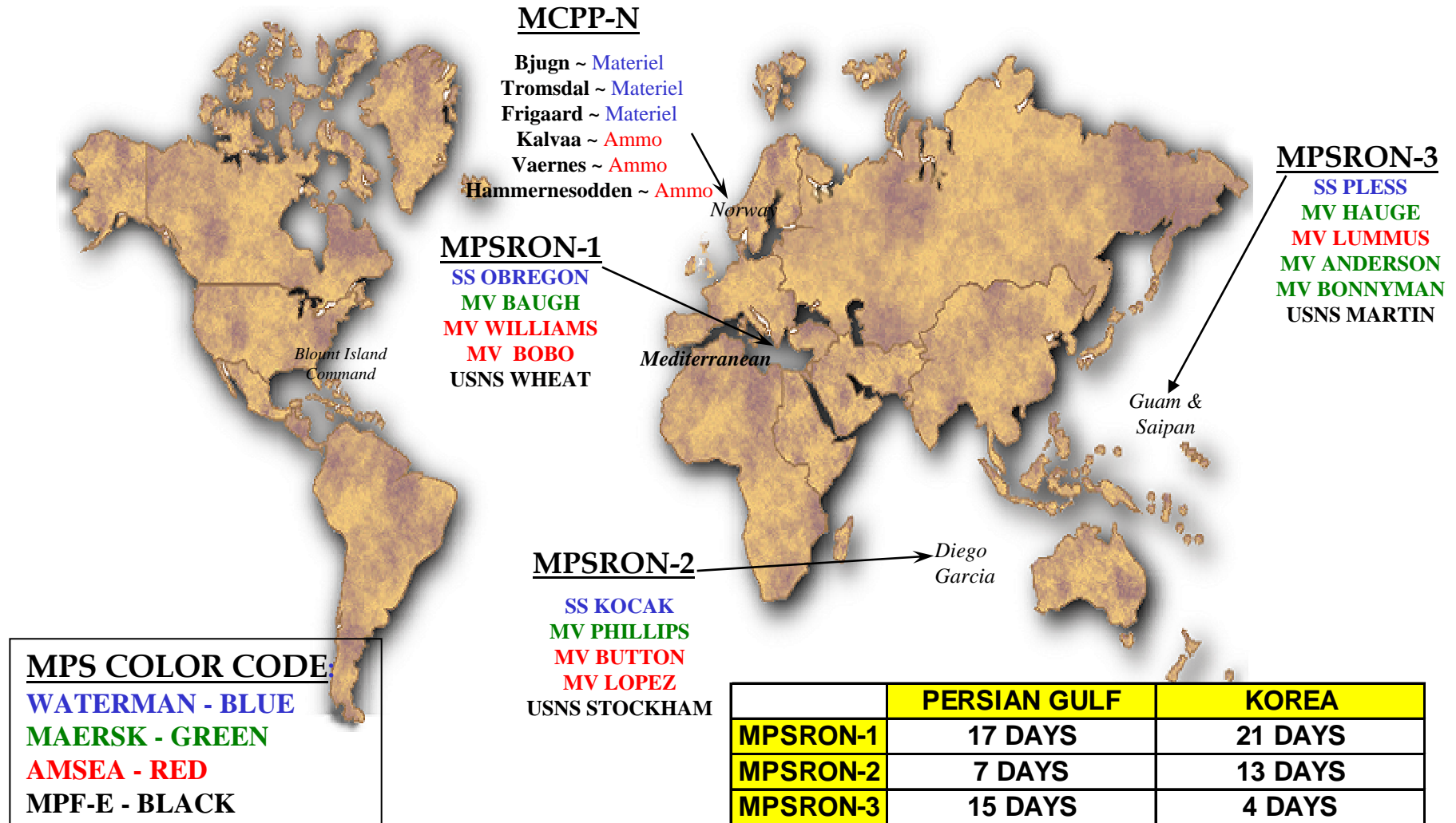
- Align purpose and strategy into an integrated network
- Reduce costs and cycle times
- Increase customer satisfaction: 1-800-952-3352
- Centralize and focus supply chain management
- **Materiel Management**
  - Inventory
  - Maintenance
- **Supplier Relationship Management**
  - From/To LOGCOM
  - Performance Based Logistics and Agreements
- **Distribution Management**
  - Warehousing
  - Transportation
- **Customer Relationship Management**
  - Organized to support the warfighter
  - Open/Continuous communication

*Logistics Solutions for the Warfighter*





# Strategic Prepositioning



*Logistics Solutions for the Warfighter*





# MPF Maintenance Cycle



- **Concept**
  - Ammunition reworked at NWS, Charleston
  - All equipment offloaded and maintained at Blount Island
  - 36-month rotation cycle for entire MPF
  - All 16 ships...1 ship at a time
  - Offload to Backload: approx 60 days per ship
- **Critical Process for MPF Readiness**

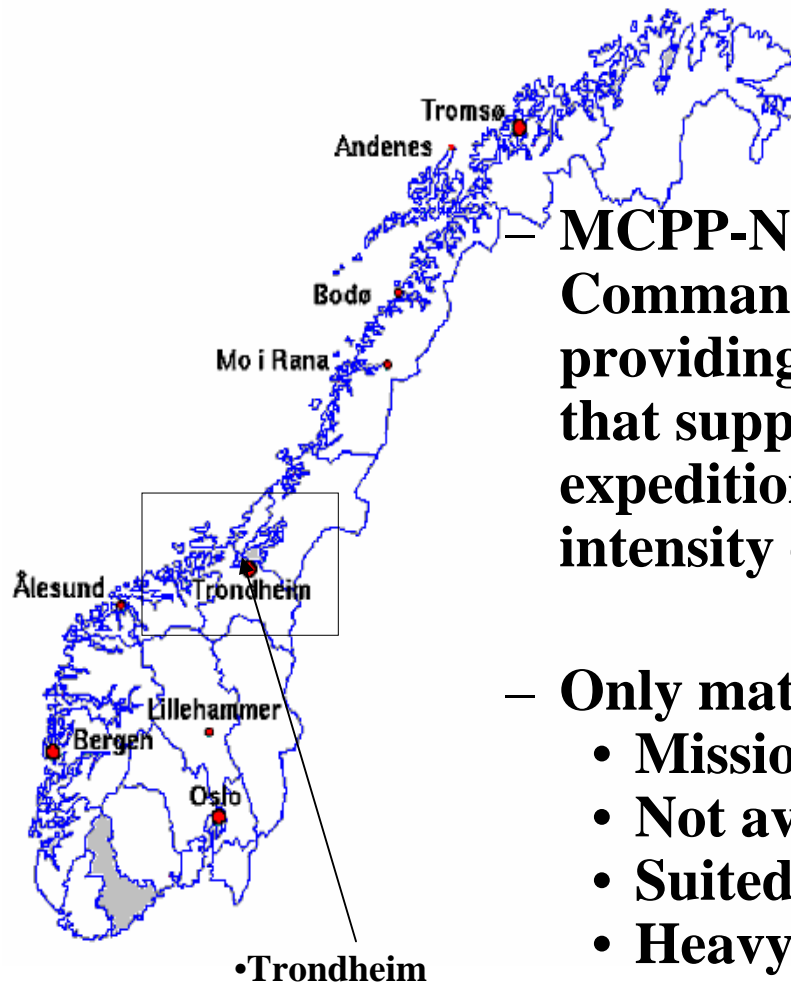






# Marine Corps Prepositioning Program – Norway

## (MCPN)



- MCPN enhances Regional Combatant Commanders' operational responsiveness by providing mission-tailored, prepositioned assets that support global U.S. Marine Corps expeditionary operations ranging from low to mid intensity conflicts.
- Only materiel that is:
  - Mission Essential
  - Not available through host nation
  - Suited for extended storage
  - Heavy weight/high volume

*Logistics Solutions for the Warfighter*





# Depot-level Maintenance

**MISSION:** Sustain the operating forces with responsive depot-level maintenance, repair, and technical support worldwide

**The Maintenance Centers also provide:**

- Inspect and Repair Only as Necessary
- Prep for ship and care-in-store
- Support to other Services & Agencies
- Special projects as requested
  - Hardened Vehicles
  - Explosive Resistant Coating

*Logistics Solutions for the Warfighter*







# Contract Management

---

## Products & Services

- **Develop Requirements & Acquisition Strategies**
- **Execute & Administer Contractual Instruments**
- **Augment Contingency Contracting Operations**
- **Provide Oversight of Contracting Operations for BIC and CBIRF**
- **Provide aggressive procurement strategies**
- **Provide Product Support Integration**
- **Execute Full Range of Contractual Actions, from SAP to Complex Procurements**





# End State

---

## **Provide worldwide ...**

- integrated logistics/supply chain and distribution management
- depot-level maintenance management
- strategic pre-positioning
- contract management

**... in support of the operating forces**





---

# Operational Relevance

*Logistics Solutions for the Warfighter*





# Reset the Force

---

- Encompasses maintenance and supply activities that restore combat capability to unit and pre-positioned equipment that was destroyed, damaged, stressed or worn out beyond economic repair due to combat operations by repairing, rebuilding, or procuring replacement equipment. These activities involve Depot and Field Level repairs/overhauls that upgrade existing equipment through the insertion of new technology or that restores existing equipment to a near zero miles/hours condition.





# Principal End Item Rotation

- **Purpose:** sustainment of the warfighter in-theater with the best possible equipment
- Retrograde of damaged/fatigued principal end items to CONUS
- Replenishment with serviceable equipment







# Equipment Rotation and Redistribution

---

- **Equipment Rotation:**
  - *Improve, Prolong, and Enhance*
- **Logistics Command...**
  - **Plan, stage, and ship**
  - **Monitor redeployment and manage assets**
  - **Develop sourcing solutions for ongoing rotation requirements**



*Logistics Solutions for the Warfighter*





# Equipment Rotation and Redistribution

---

- **Equipment Redistribution**
  - *“Relieve the operating forces of the burden associated with redistribution.”*
  - **A comprehensive, coordinated effort...**
    - **MARCENT**
    - **OIF MAGTF**
    - **Logistics Command**





# MEU Augmentation Pool

---

- **Enhance the MEUs' combat readiness and responsiveness**
- **Reduce call forward equipment from CONUS**
- **Logistics Command**
  - **Maintains, accounts, upgrades, rotates, issues, and assesses**
  - **IOC, 1 Nov 06**
  - **FOC, 1 Apr 07**





# Tailored In Theater Support

---

- **Requirements-based logistics solutions**
  - **Forward In-Stores**
  - **Maintenance Augmentation**
  - **Reparable Issue Point**
  - **Army Materiel Command**



*Logistics Solutions for the Warfighter*





# Equipment Hardening

- **Rapid prototyping and proofing**
  - **LAV-A2 Upgrade**
  - **M1114 Frag-5 Kits**
  - **Mine Roller**
  - **HEAT**







# Vehicle Hardening

- **Logistics Command**  
**Marines and Civilians**  
**provide:**
  - Marine Armor Kit installation on wheeled and tracked vehicles
  - Deployment of Armor Installation Teams to support forward units
  - Explosive Resistant Coating
- Innovative and effective solution to save lives



*Logistics Solutions for the Warfighter*





# Mojave Viper Support

- **Unique and economical surge capability**
  - **Support in coordination with op tempo**
  - **Restores and preserve critical training assets**
    - **HMMWV**
    - **MTVR**







# Questions

*Logistics Solutions for the Warfighter*





# Combat Vehicle Conference

*MG  
Mike  
Lenaers*

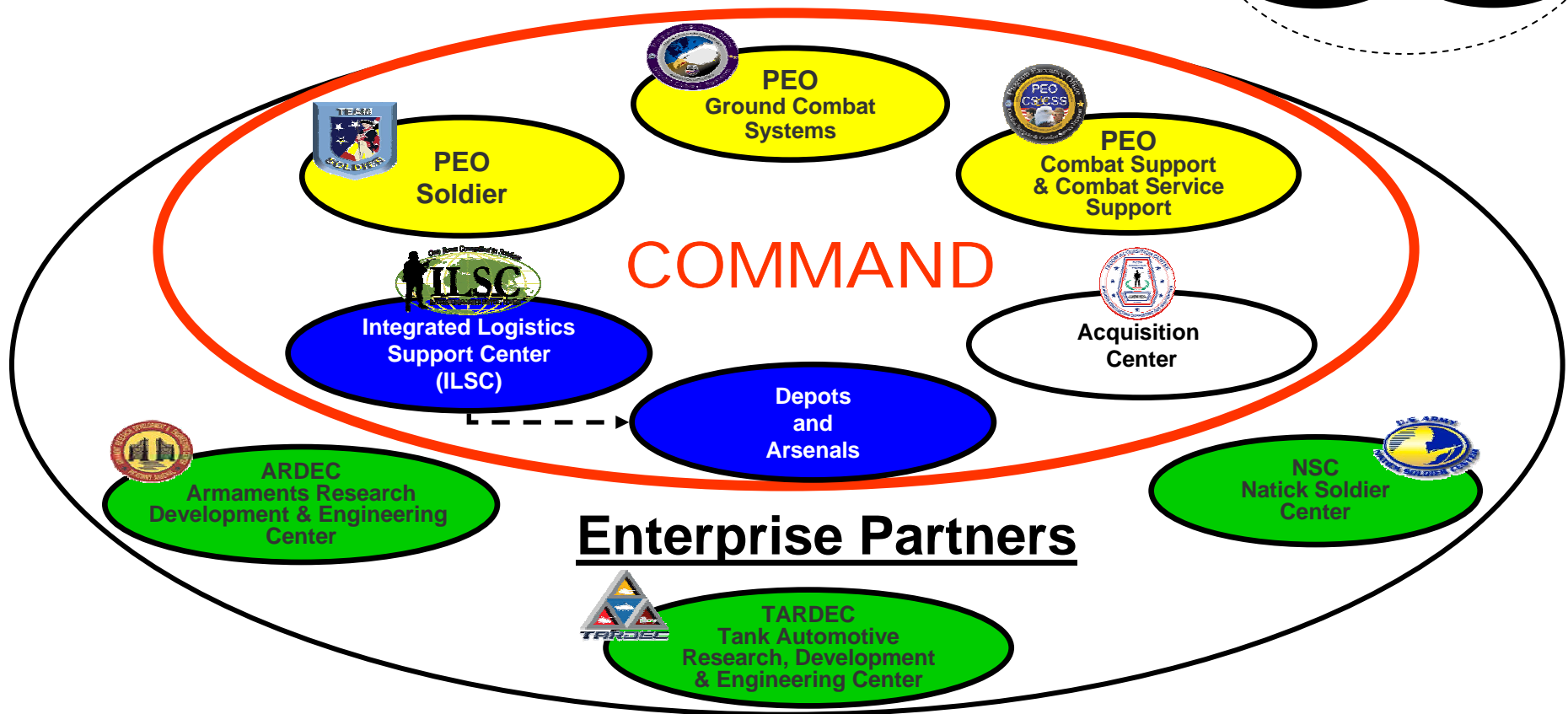
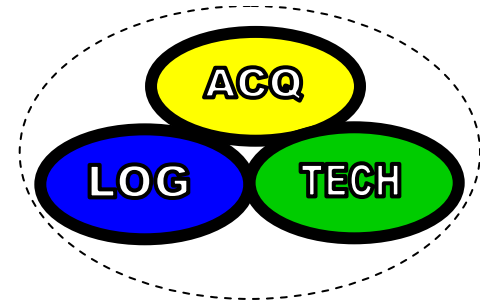
*24 OCT  
2006*





# TACOM LCMC

Organization



## Alliance Partners



PM  
FCS



PEO  
Ammo



JPEO  
CBD



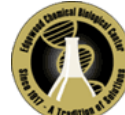
ATEC



DLA



TRADOC



ECBC



RDECOM



USASAC

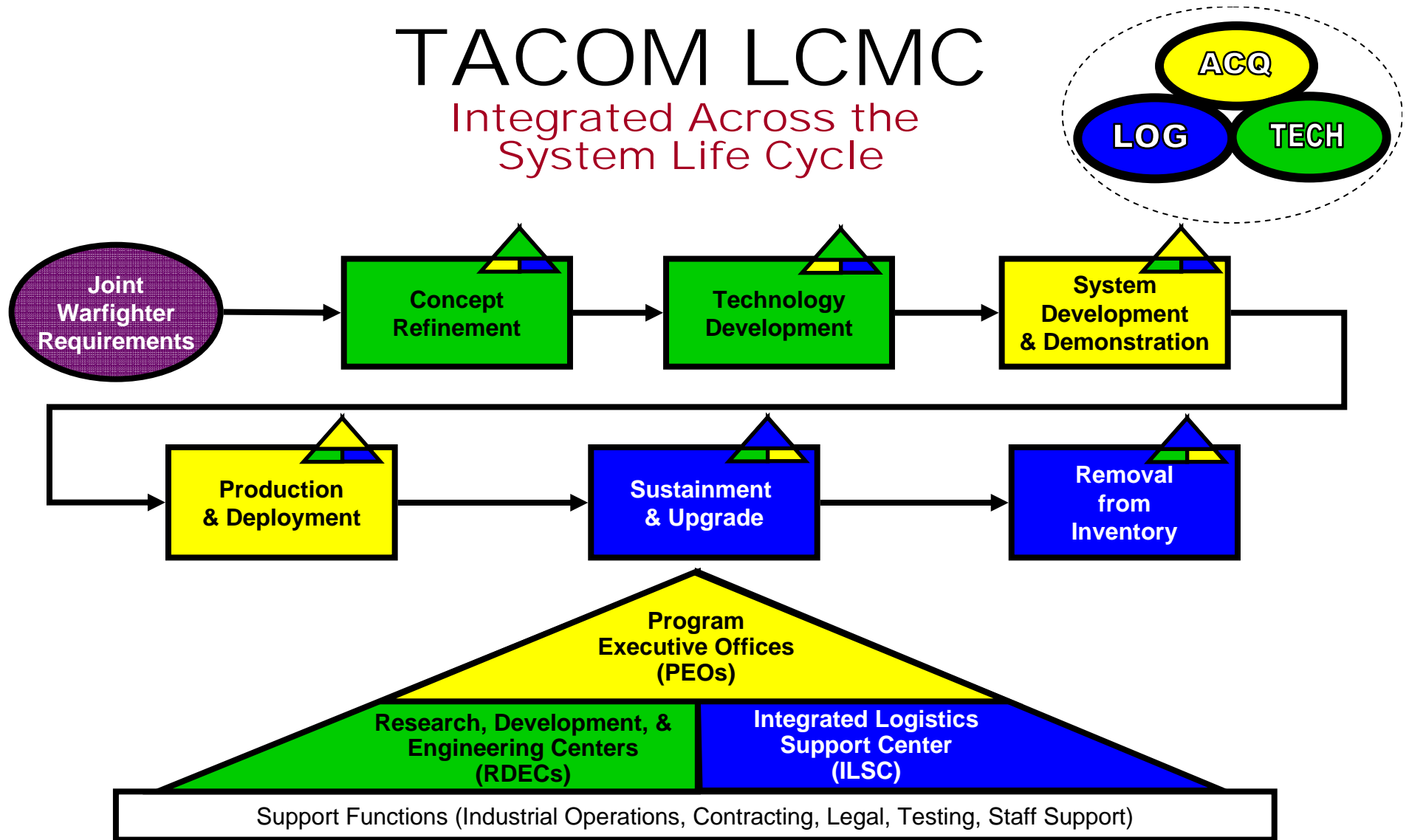


DCMA



# TACOM LCMC

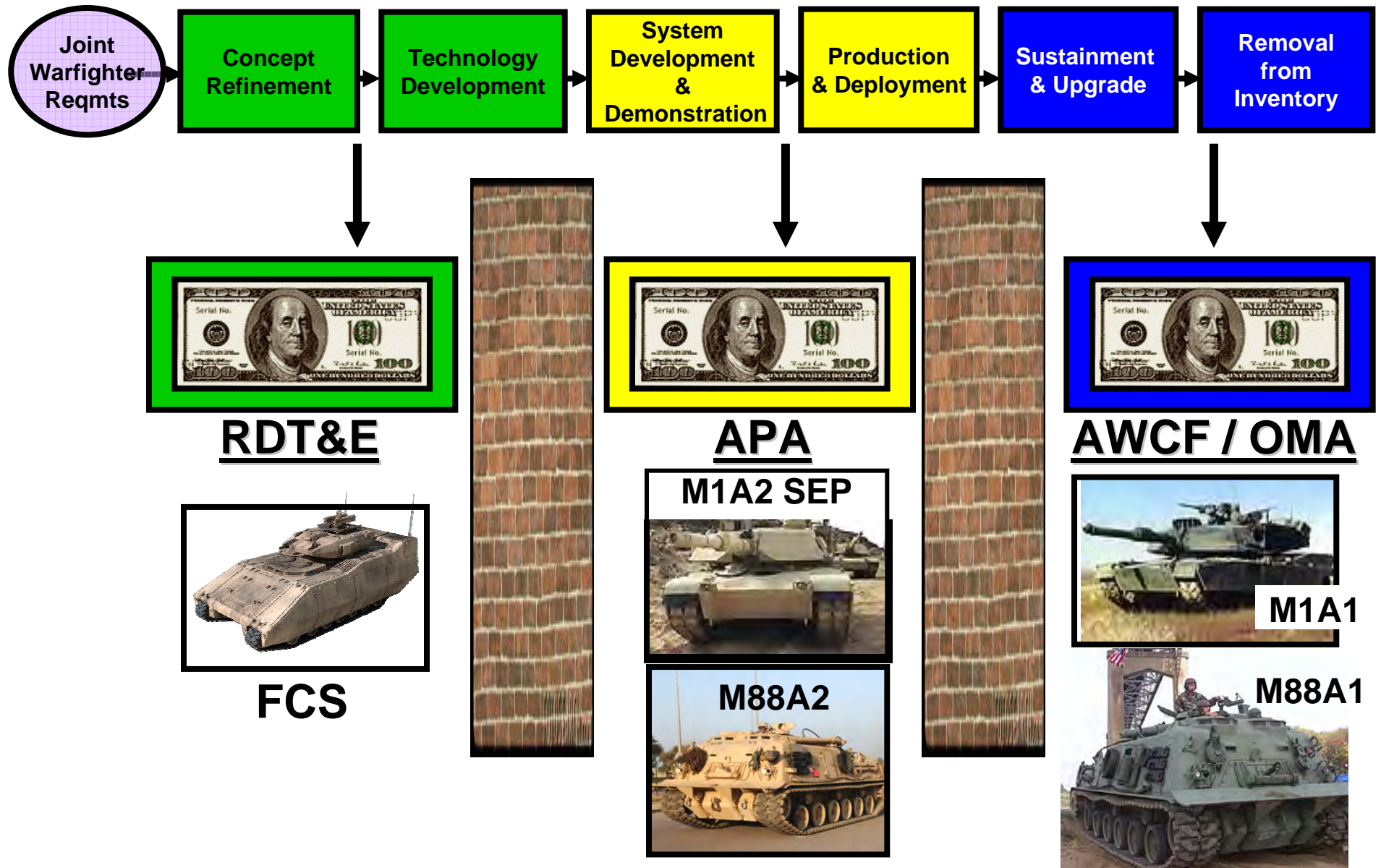
Integrated Across the  
System Life Cycle



The objective is to get products to the warfighter faster, make our good products even better, minimize life cycle costs, and enhance the effectiveness and integration of our Acquisition, Logistics, and Technology communities.



# *Funding Restrictions*



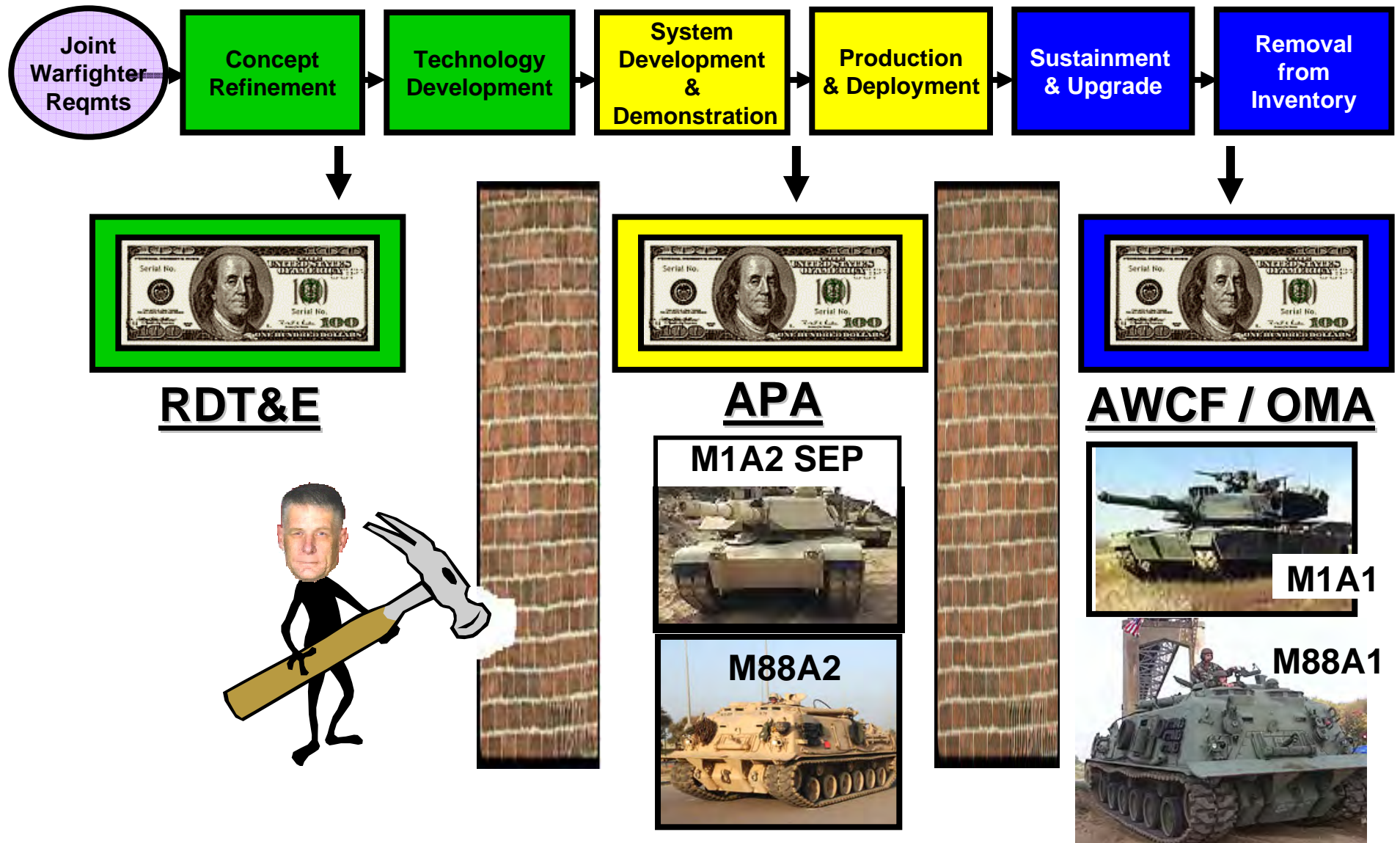


# Remember the "Golden Rule"





# Funding within the Life Cycle



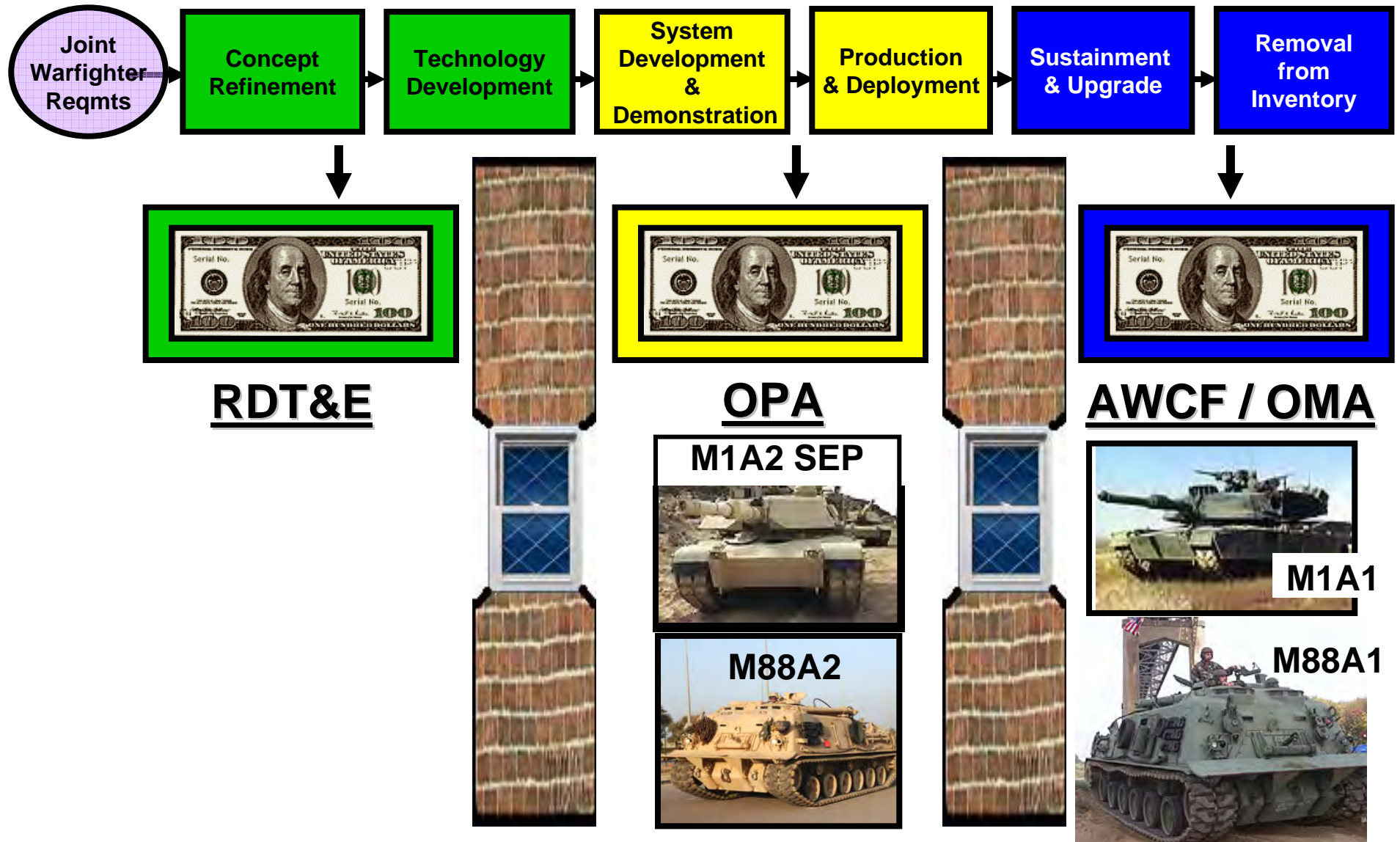


# It Isn't That Tough



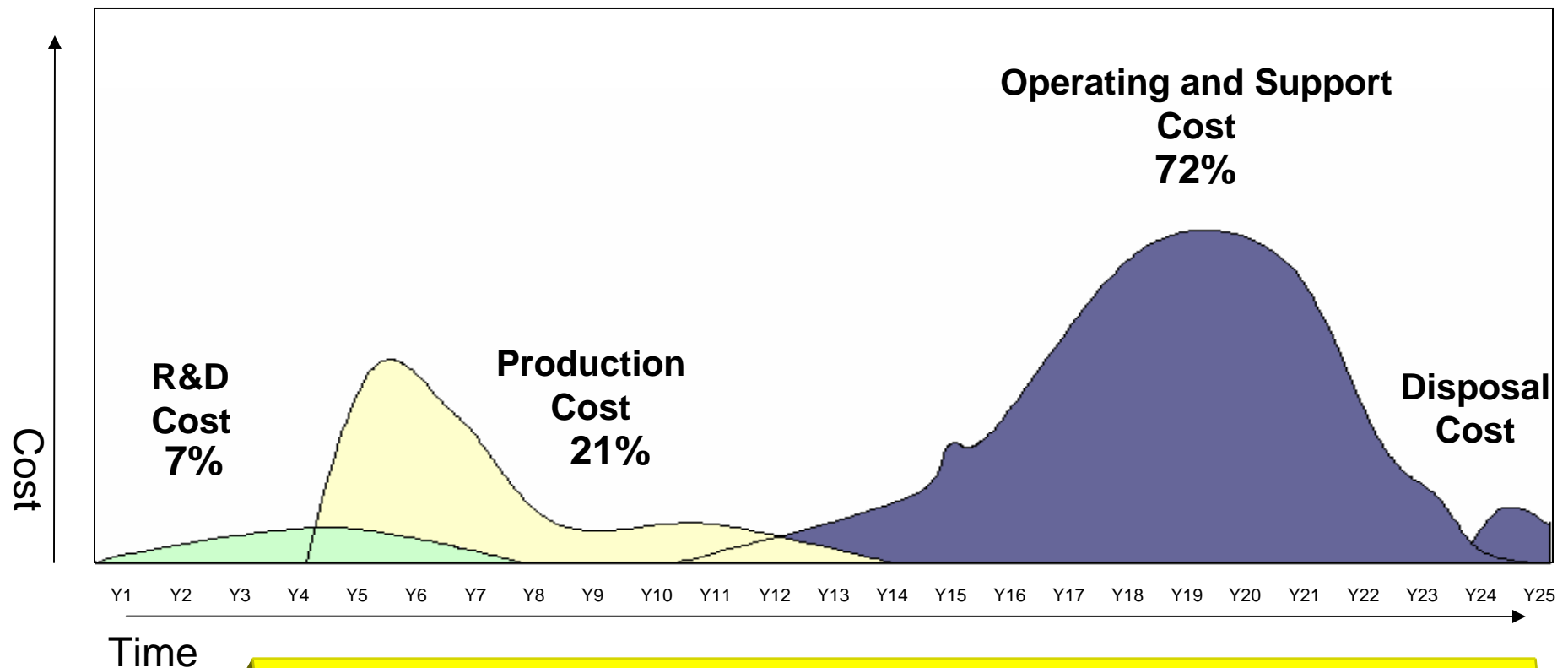


# Funding within the Life Cycle





# Life Cycle Costs



**Continuous Improvement to reduce operating and support cost**



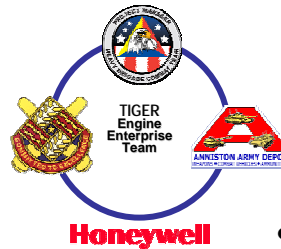
# TIGER Enterprise

## Program

Execute a 5 Year Integrated program that sustains the AGT 1500 fleet to an average MTBDR of 1400 hours without increasing O&S Costs

### Requirements:

1. Increase Durability without O&S Increase
2. Establish a Single Overhaul Standard
3. Implement Supply Chain Management
  - No Material Shortages
  - Quality Material
4. Collect Performance Data on All Engines and Use Data to Drive Future Improvements
5. Modernize 100% Engine Fleet by 2010



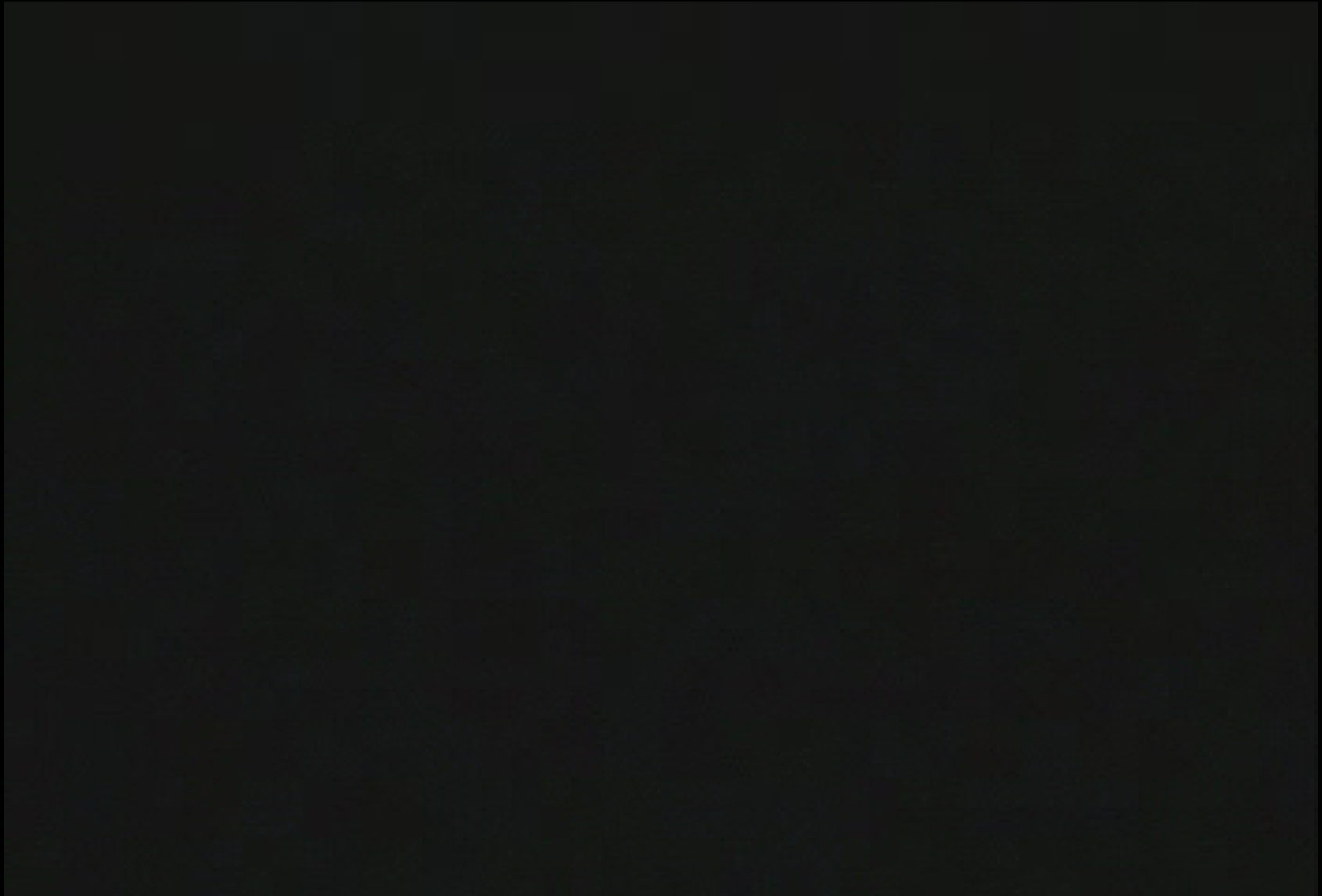
## Status

- Process on track to award Program Year 2 (PY2) contract in December 2006 (PAA & AWCF).
- Field sites operational at Hood, Knox, Stewart, Arifjan, Casey, & JCMC (LATP). NTC supported by roving FSE. Benning being stood up.
- Initial transition of electronic work instructions (Honeywell electronic Manufacturing, Operations & Tooling (eMOTs) at ANAD for assembly operations completed.
- Implementation of durability improvements moving IAW accelerated schedule.
- Formal durability test program started. First 361 hour qual test completed June 06. 500 hour test initiated. Completion in Oct 06.
- Temporary FBM data base up and running with data.



# TIGER ENGINE

## I "HOPE" LOOKS ARE NOT DECEIVING





# Bradley Transmission HMPT 500 – 3ECB

## Operational Reliability Program (THOR)



### Accomplishments:

- Common Build Standard for ALL transmission variants established
- Government BCA PSI recommendation approved by MDA
- Systematic Tear Down Failure Analysis Effort in Place
- Material Management approach improvements on-going
- NMWR fully implemented at all sites

### Program Strategy:

- Pure Fleet to HMPT 500-3ECB Leverage, RESET, RECAP & Attrition
- Single Standard & Validated Process
  - Single, Improved Standard for RESET / Remanufacture
  - Define inspection requirements with standard acceptance & control testing
- Integrated Life Cycle Management Program
  - Use LCMC Approach to leverage USG/OEM resources and expertise
  - Incentivize partners through Metrics and Performance Criteria
  - Establish Single Procurement Activity for all Transmissions

### Objectives for 1<sup>st</sup> Quarter FY07:

- First Article Tests in process
  - L3 FAT complete
- Finalize “part kits” development
- THOR Contracting Pre-Documentation Complete
  - Finalize J & A, Acquisition plan, Bundling Document
  - Develop Statement of Objectives
  - Develop Metrics
- Begin Alpha Contracting



# Condition Based Maintenance Program Scope

- Functional data from electronic control modules
- Platform sensors and Data
- Automatic data collection, storage, and transmission (transparent to the unit)
- Unique Item Tracking to key components

- Maintenance and Logistics analytical tools and reports
- Correlate Maintenance actions with data collected
- Risk reduction with Fort Knox Fielding
- Establishes the foundation for the LCMC CBM+ Capability

## Vehicle Configurations



## Vehicle Configurations





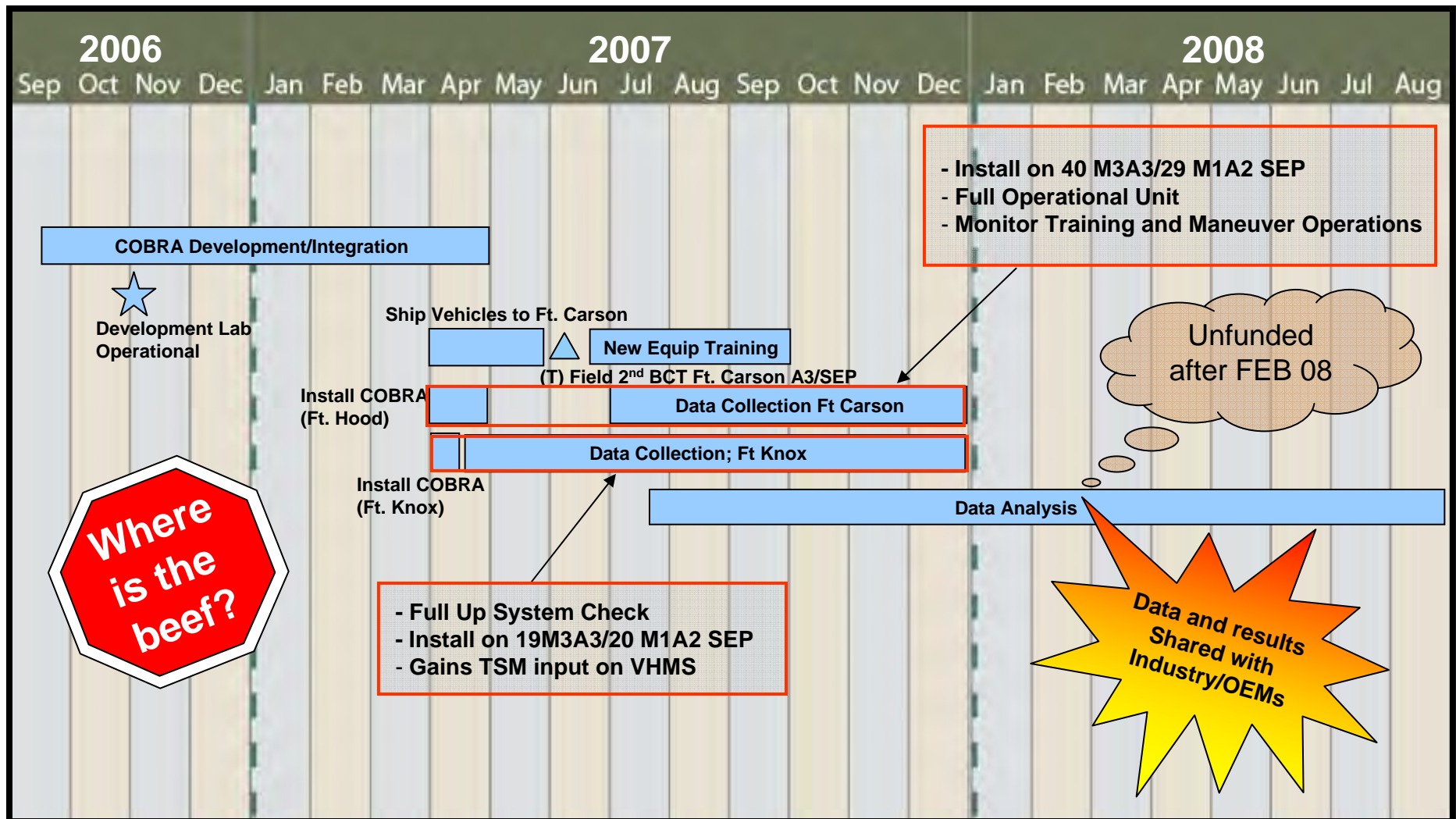
# Condition Based Maintenance Platform Data Categories

- Critical System Indicators
  - Crew Pressure Low, XMSN Oil Pressure Low, Engine Oil Temp High, Parking Brake On, Clogged Filters, 1st/2nd Shot Discharged, Low Oil; Engine Overspeed, etc.
- Critical LRU Fault Indicators
  - HPDU Fault, DID Fault, CITV Fault, DECU Fault, TGPU Critical Fault, Pulse Jet System Fault, etc.
- Subsystem Fault Indicators
  - Rear Left Fuel Pump Inop, High Electrical System Voltage, APU Circuit Breaker Tripped, FBCB2 Fail, Ballistic Solution Update Error, NBC Main Disabled, etc.
- Subsystem Mode Indicators
  - Lighting System Settings, Heater Settings, Fuel Transfer Settings, Operational Settings of NBC System, Active APU Settings, FBCB2 Operation Status, etc.
- TWV
  - CTIS, ABS, Engine, Transmission, Air Inlet Temperature, Alternator Current, Battery Current (Cranking), Battery Negative voltage Drop, Battery Voltage (cranking), Coolant Level, Coolant Pressure, Coolant Temperature, ECU Input Voltage, Engine Speed,
- Diagnostics Indicators
  - DECU Health Check Indicator, Utility Bus Comm Failure, 1553 Bus Comm Failure; MPU Critical Failure, Cautions and Warnings, Fault Filters, FIT test data, LRU level Self Test results, Utility Bus Test Data, Cable Disconnects, etc.
- Functional/Operational Indicators
  - System Operation Mode, LRU Operating Mode Requests, Speedometer, System Voltage, Odometer, Engine Hours, Fuel Level, Engine Operating Mode, Transmission Shift Select,

***Over 2700 Data Elements Available***



# Condition Based Maintenance Schedule





# Need Your Help

- Industry must be fast and agile
- Continuous product improvement
  - Performance based logistics
- Condition Based Maintenance
  - Access to your data
  - Need industry help
  - What is ROI?



# AMERICA'S ARMY







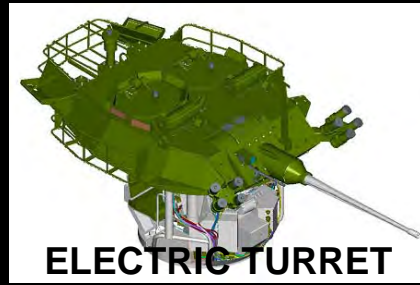
# USMC LAV- CURRENT TO FUTURE



BPUP



GEN II SUSP



ELECTRIC TURRET



ITSS



AFSS



LAV-A1



C2 UPGRADE



JAMMERS



SLING SEATS



HATCH LOCK



MINE ROLLER



BALLISTIC  
BLANKET



IR HEADLIGHT



BLAST SHIELD

Col Mike Micucci, USMC – PM LAV 24 Oct 06





# USMC LAV- CURRENT TO FUTURE

**Hardware  
Obsolescence**

**Active Protection  
Systems**

**Fuel Tank  
Protection**

**Mine  
Protection  
Initiatives**

**Sense and  
Respond**

**120mm  
Mortar  
Variant**

**Light Armored  
Marine  
Infantry  
Carrier**

**LAV-A2**



**Multi-role  
Vehicle  
Weapons  
mount**

**Active  
Suspension**

**Weight  
Savings**

**Improved  
Automotive  
Technologies**

**Gen II  
Power pack  
supply**

**Light  
Weight  
Armors**





# **FCS Program Overview**

## **NDIA Combat Vehicles Conference**

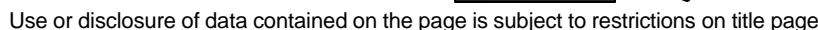
**COL(P) David Ogg**

**Deputy Program Manager,  
Networks and Complementary Programs  
25 Oct 06**

**Approved for Public Release; Distribution is Unlimited. Case GOVT 06-6168. 10 OCT 2006.**



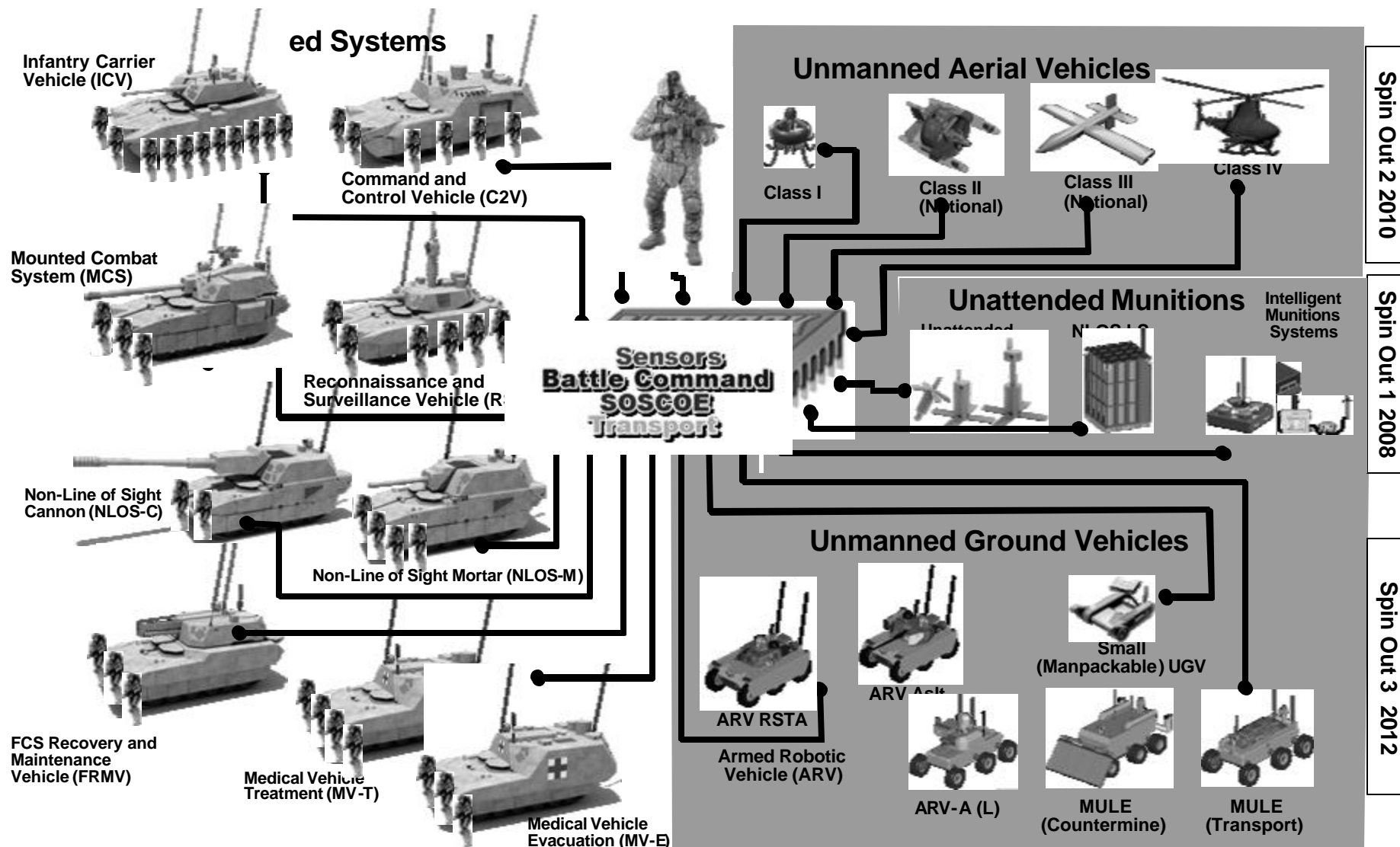
**PROGRAM MANAGER**  
**FCS**  
**BRIGADE COMBAT TEAM**  
*One Team-The Army/Defense/Industry*





# FCS Brigade Combat Team...

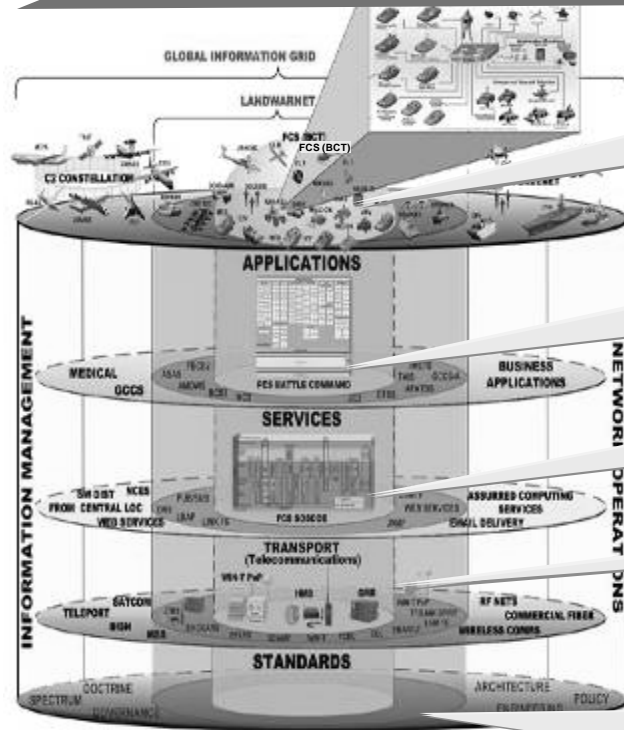
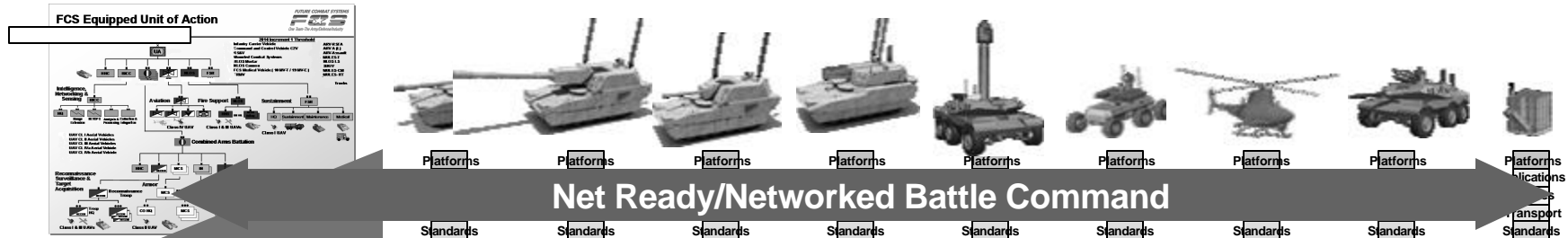
## 18 Integrated Systems + 1 Network + 1 Soldier



## Full Brigade Combat Team... 2014



# FCS Layered, Networked Architecture



Command FCS (BCT) system elements are commonly developed to integrate FCS platforms into an integrated system that is geographically dispersed

Battle Command incorporates C2, Intelligence, Surveillance, and Reconnaissance (ISR), Embedded Training, and Sustainment

Net ready information management element of service based architecture

Heterogeneous transport layer enables robustness

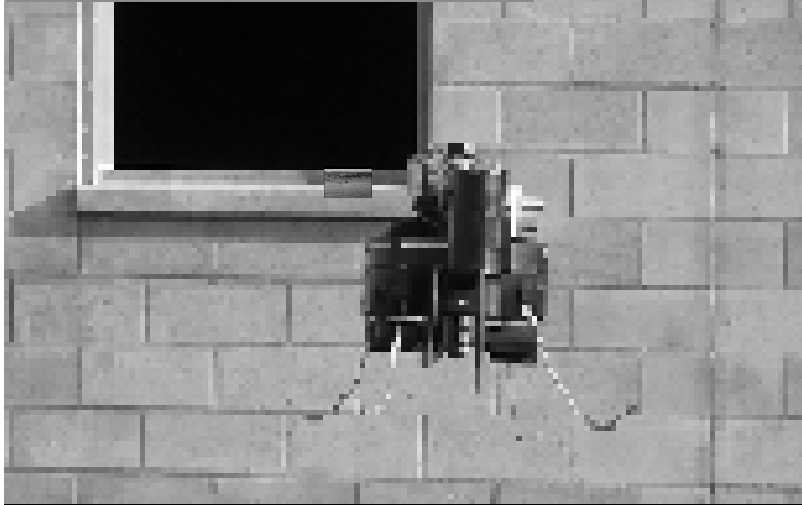
Networked battle command, embedded training, and supportability developed Technical View (TV-1) integrated into SoS level TV-1 standards supporting integration

**Integrated Architecture Provides Design-Phase Flexibility and Tactical Adaptability For The Networked FCS (BCT)**



# Recent Significant Events

## Class I Flight Test



## Autonomous Nav System



## MULE



## Fire Scout Flight Test



**Demonstrations and Technologies On Track**



# Recent Significant Events

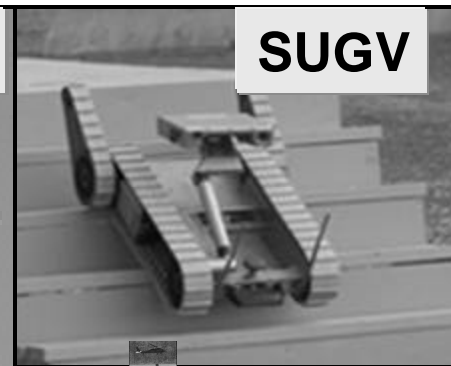
**Integrated Mission Test 0**



**NLOS-LS Transport**



**SUGV**



**JEFX-06**



**Stryker Leader / Follower**



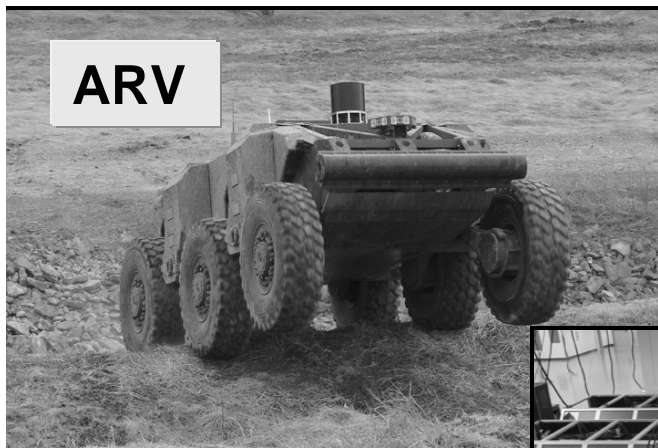
**120 MM Cannon**



**Demonstrations and Technologies On Track**



# Recent Significant Events



**ARV**



**Active Protection Systems**

**Unattended  
Ground Sensor**



**SoSIL**



**NLOS-C  
Fabrication**



**NLOS  
Cannon**

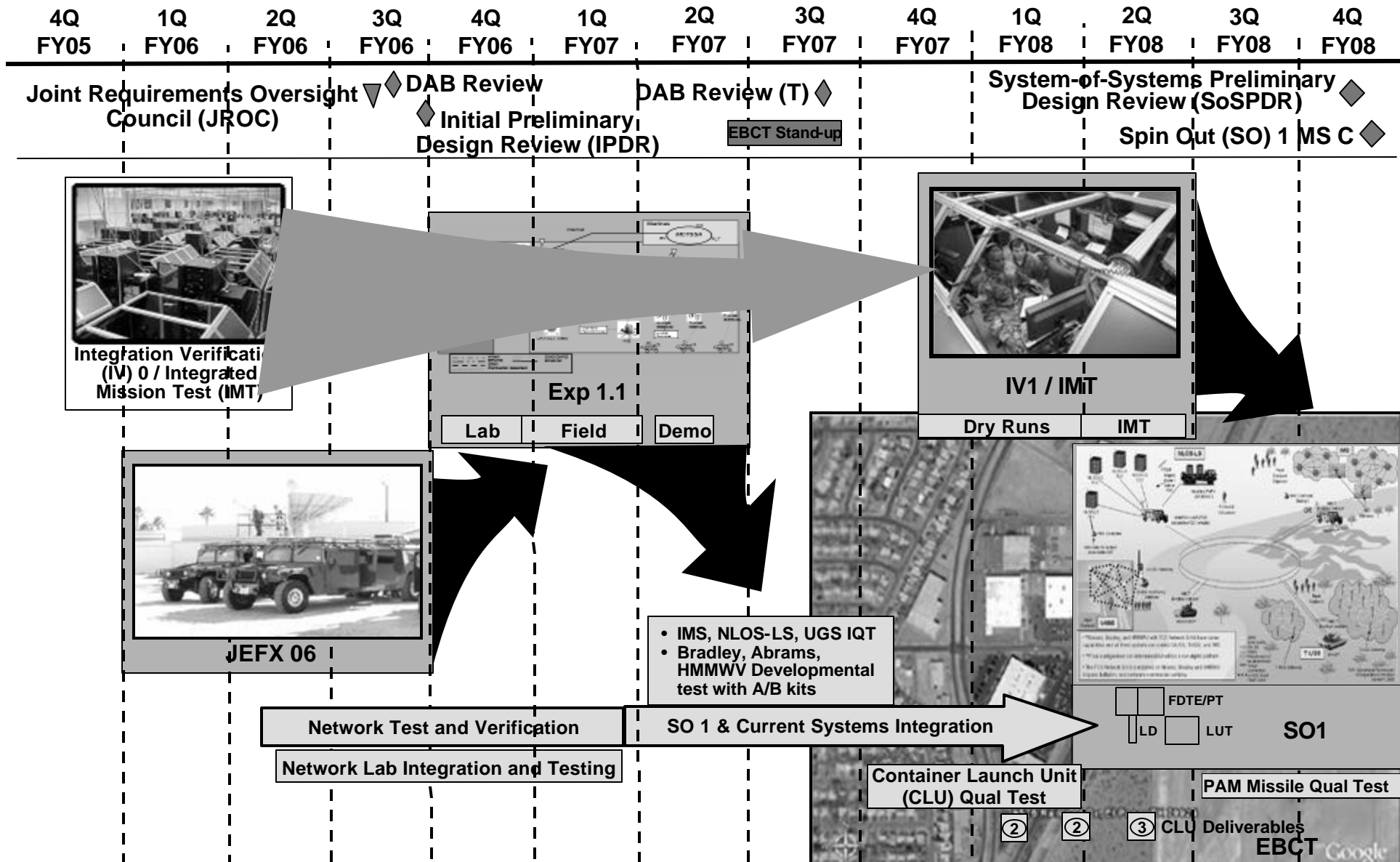
**Experiment 1.1 Vehicles**



**Demonstrations and Technologies On Track**



# Look Ahead Through 2008

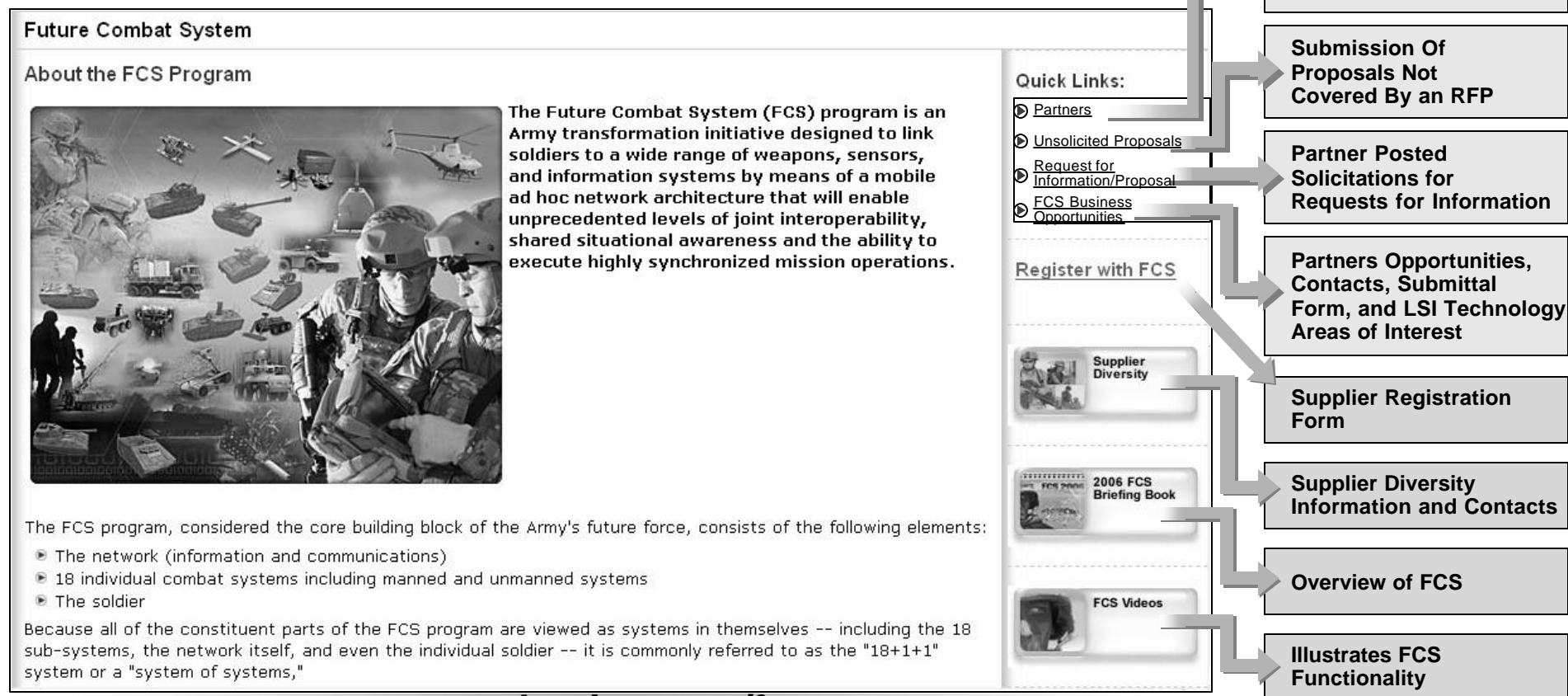




# How to Get Involved with FCS



## FCS External Website



[www.boeing.com/fcs](http://www.boeing.com/fcs)  
[www.army.mil/fcs](http://www.army.mil/fcs)



# Panel Speakers



- COL Michael Williamson
  - Project Manager, FCS Networks Systems Integration
- COL Charles Coutteau
  - Project Manager, FCS Manned Systems Integration
- COL Chris DeLuca
  - Project Director, Spin Outs





## ***NETWORK SYSTEMS INTEGRATION***

***COL Michael Williamson***

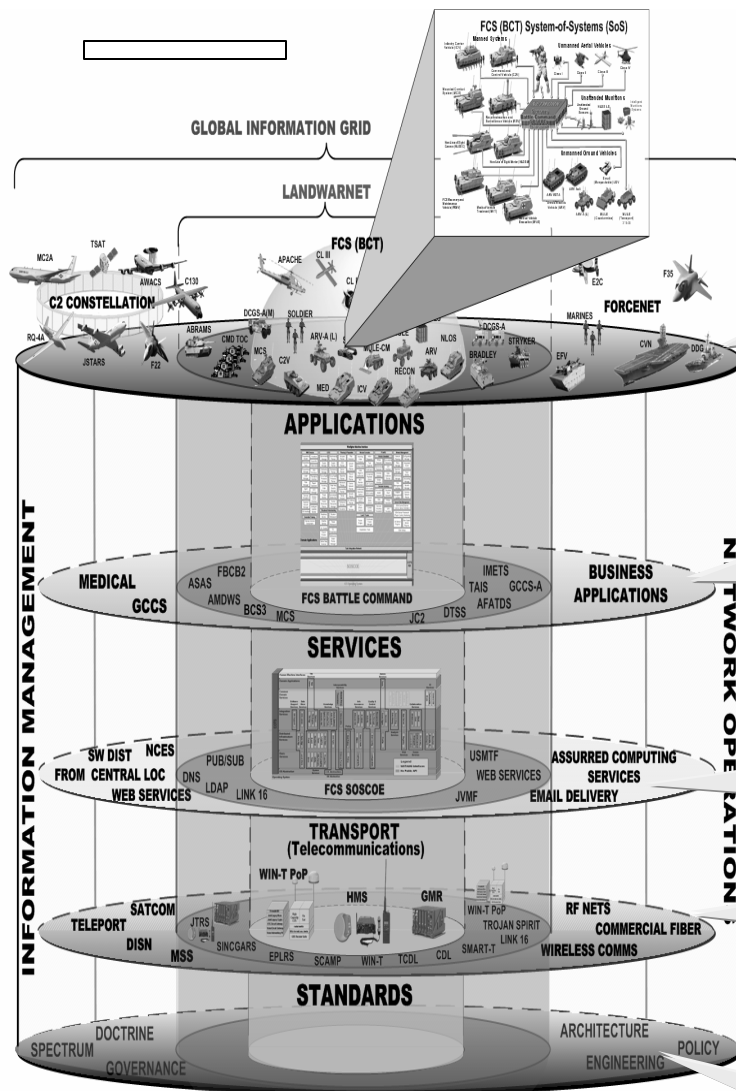
***Project Manager  
Future Combat Systems, Brigade Combat Team,  
Network Systems Integration  
PM FCS (BCT) NSI  
Fort Monmouth, NJ  
732-427-7402***

***25 October 2006***

**Approved for Public Release; Distribution is Unlimited. Case GOVT 06-6168. 10 OCT 2006.**



# FCS Layered Network Architecture



## Platforms & Sensors

Suite of ground/air, manned/unmanned platforms, with a diverse set of sensors tailored to the warfighters needs

## Applications

Battle Command and Control, Intelligence, Surveillance, and Reconnaissance (ISR), Embedded Training, and Sustainment

## Services

Common toolset of infrastructure services, (i.e. information assurance, interoperability, etc.)

## Transport

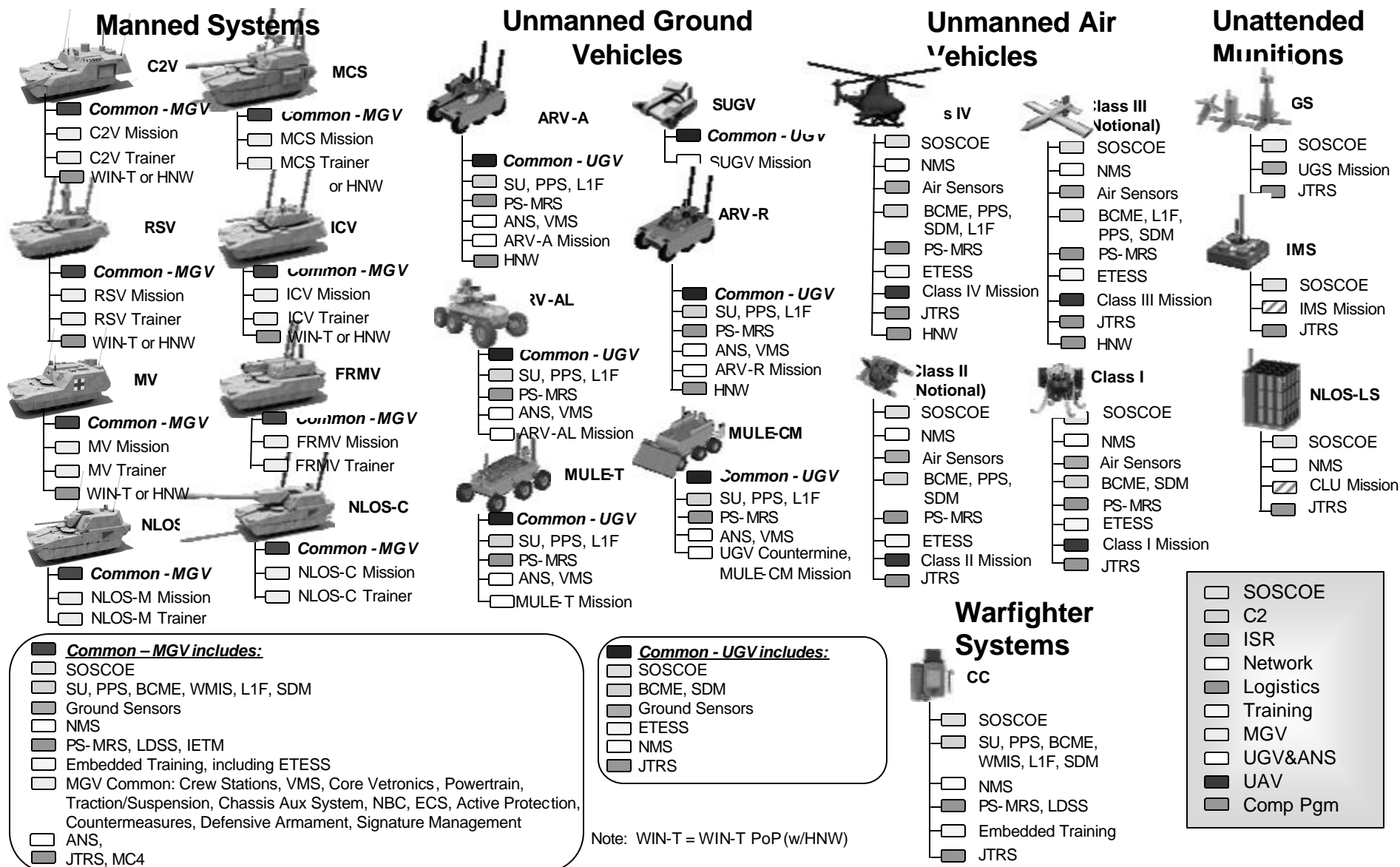
Multi-Tiered (Ground, Air, Space), Dynamic, On the Move Communications Network

## Standards

Common set of standard to enable interoperability and end-to-end performance metrics

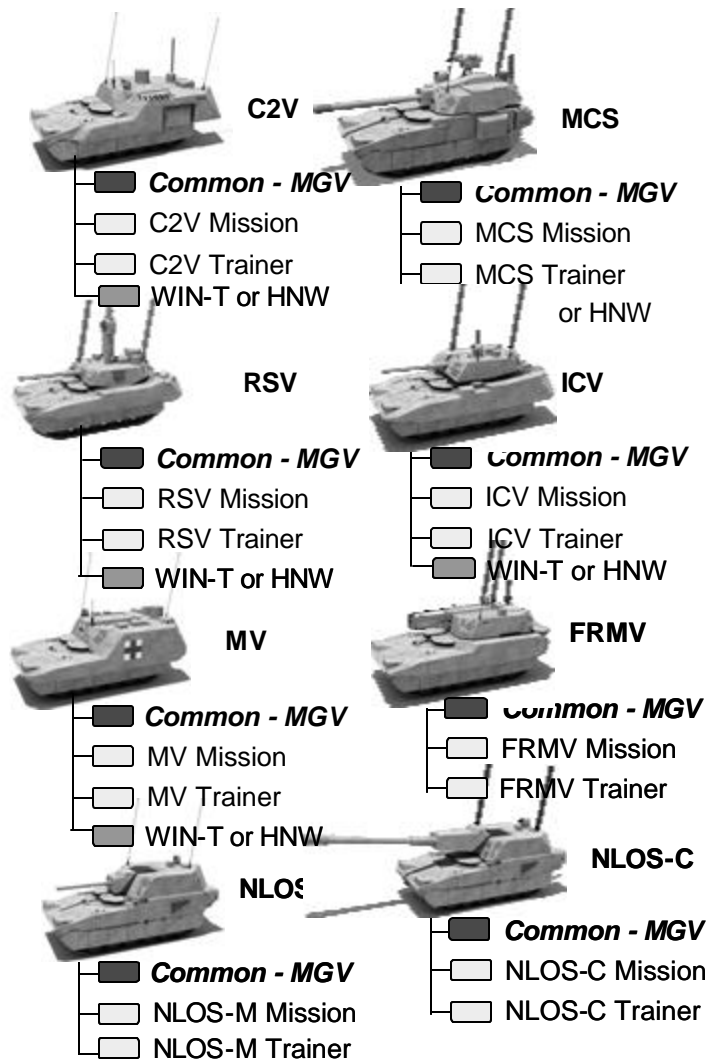


# All Systems Include Software & Radios





# Manned Systems Include Software & Radios



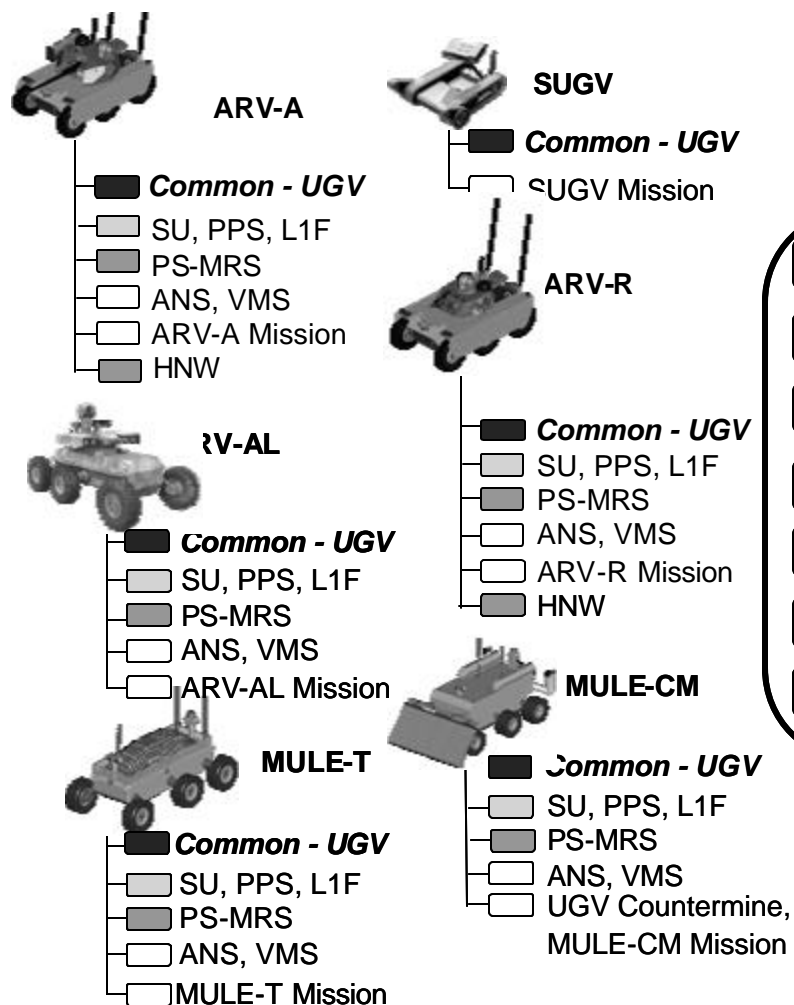
## Common - MG includes:

- ☐ SOSCOE
- ☐ SU, PPS, BCME, WMIS, L1F, SDM
- ☐ Ground Sensors
- ☐ NMS
- ☐ PS-MRS, LDSS, IETM
- ☐ Embedded Training, including ETESS
- ☐ MG Common: Crew Stations, VMS, Core Vetronics, Powertrain, Traction/Suspension, Chassis Aux System, NBC, ECS, Active Protection, Countermeasures, Defensive Armament, Signature Management
- ☐ ANS,
- ☐ JTRS, MC4

Note: WIN-T = WIN-T PoP (w/HNW)



# Unmanned Ground Systems Include Software & Radios



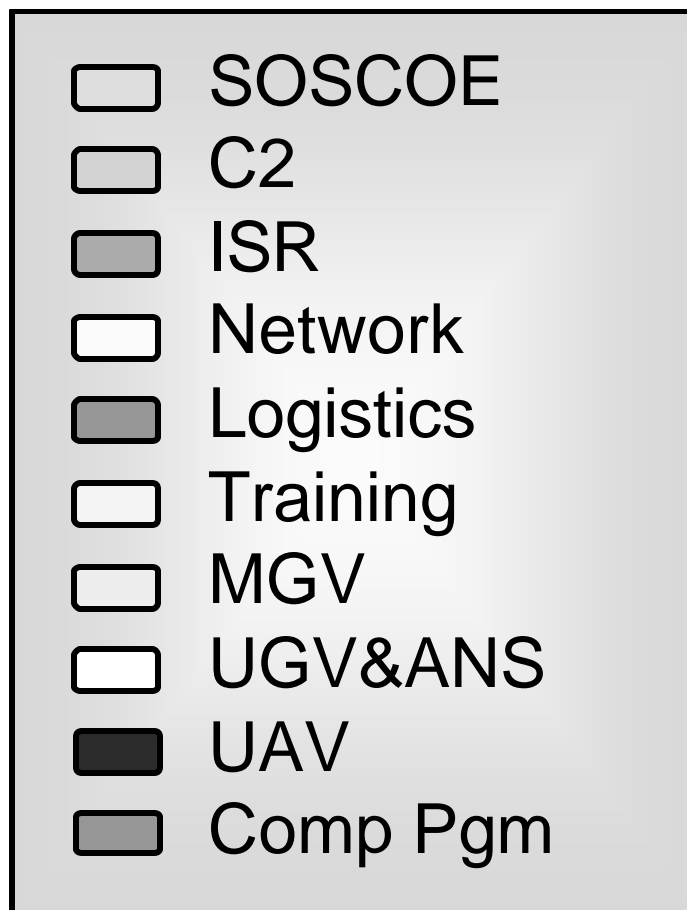
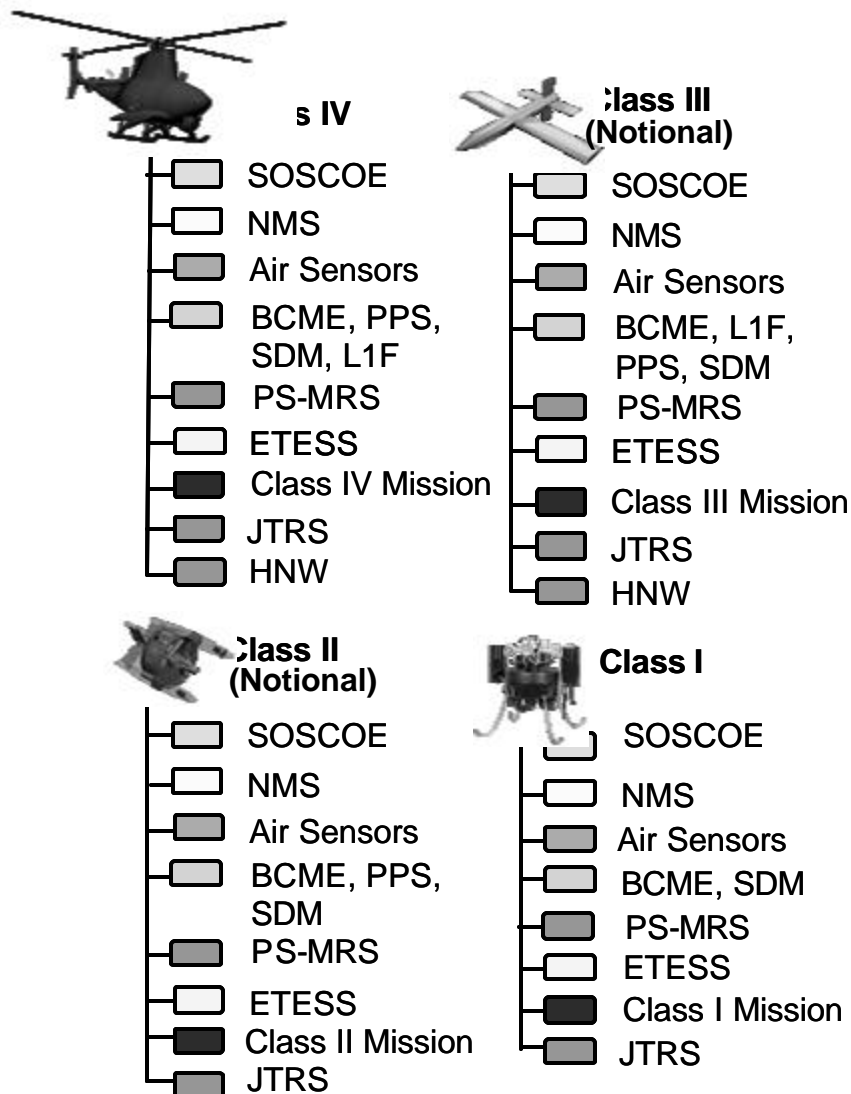
**Common - UGV includes:**

- SOSCOE
- BCME, SDM
- Ground Sensors
- ETESS
- NMS
- JTRS

Note: WIN-T = WIN-T PoP (w/HNW)



# Unmanned Air Systems Include Software & Radios



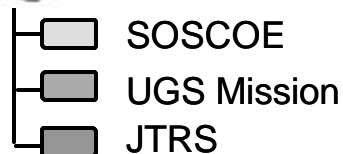
Note: WIN-T = WIN-T PoP (w/HNW)



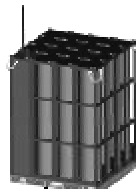
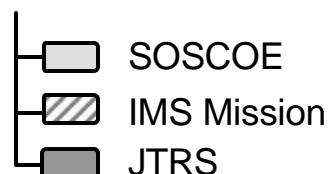
# Unattended Munitions Systems Include Software & Radios



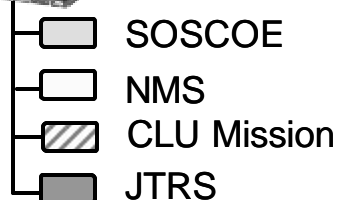
**GS**



**IMS**



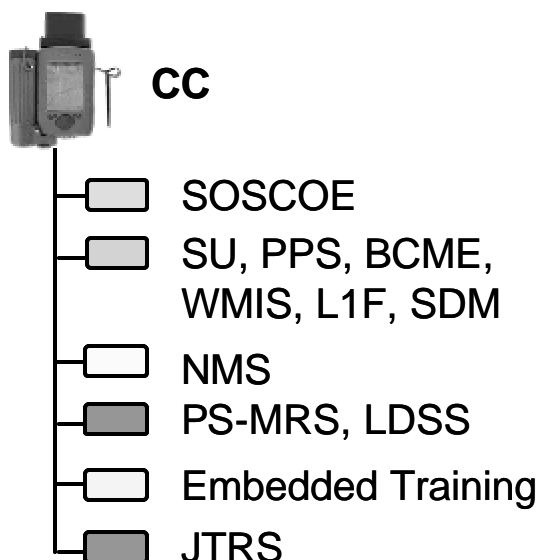
**NLOS-LS**



Note: WIN-T = WIN-T PoP (w/HNW)



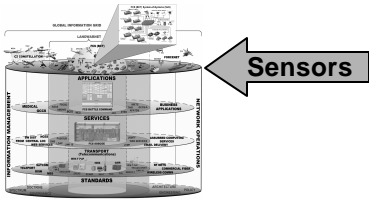
# Warfighter Systems Include Software & Radios



- ☐ SOSCOE
- ☐ C2
- ☐ ISR
- ☐ Network
- ☐ Logistics
- ☐ Training
- ☐ MGV
- ☐ UGV&ANS
- ☐ UAV
- ☐ Comp Pgm

Note: WIN-T = WIN-T PoP(w/HNW)





# ISR Key Capabilities and Requirements

PROGRAM MANAGER  
**FCS**  
BRIGADE COMBAT TEAM  
One Team-The Army/Defense/Industry

## • Functional/Operational Capabilities

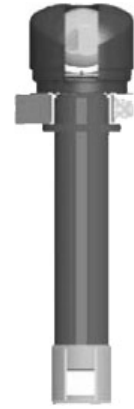
- Situation Awareness/Situation Understanding
  - Wide area search of enemy combat systems, personnel and communication signals
  - Air and ground surveillance with aided target detection and distributed fusion
  - Wide sensing coverage through manned, unmanned and unattended sensors
- Lethality / Support of networked fires
  - Tracking, designation, combat ID and BDA during target engagements
- Platform/soldier survivability
  - Detection of enemy fires, munitions and sensors
  - Detection and alerts for CBRN threats
- Assured Mobility
  - Detection of mines, minefields and obstacles
  - Development of terrain features and trafficability measurements

## • Key Requirements

- Detection ranges of key ISR sensors
- Probability of detection and false alarm rates for AiTR
- Surveillance Timelines
- Target Location Errors
- IED detection
- Concurrent operational loading of multi-function sensors
- Operation in hostile environments
- MTBEFF
- AUPC



Electro-Optical  
Sensor  
deployed on ground  
combat platforms



Electro-Optical Sensor  
deployed on ground R&S  
platforms



Multi-Function Radio Frequency  
(MFRF) system deployed on  
Ground platform



EOIR Sensor  
Deployed on SUGV

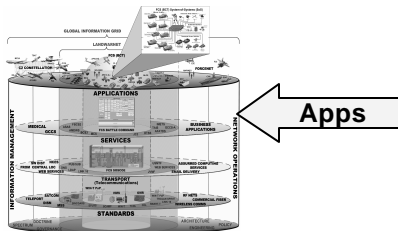


Electro-Optical Sensor  
deployed on CL IV UAV



SAR/MTI radar deployed  
on CL IV UAV

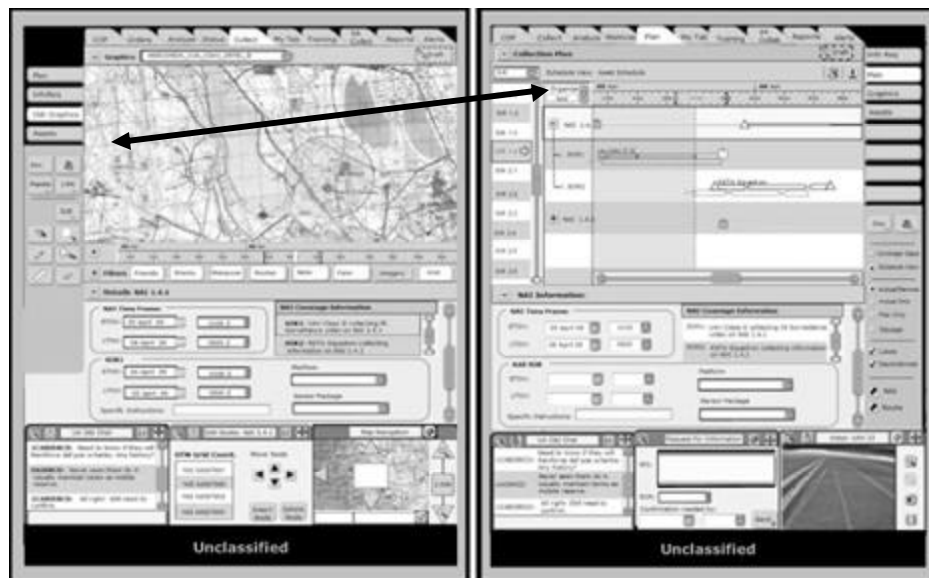
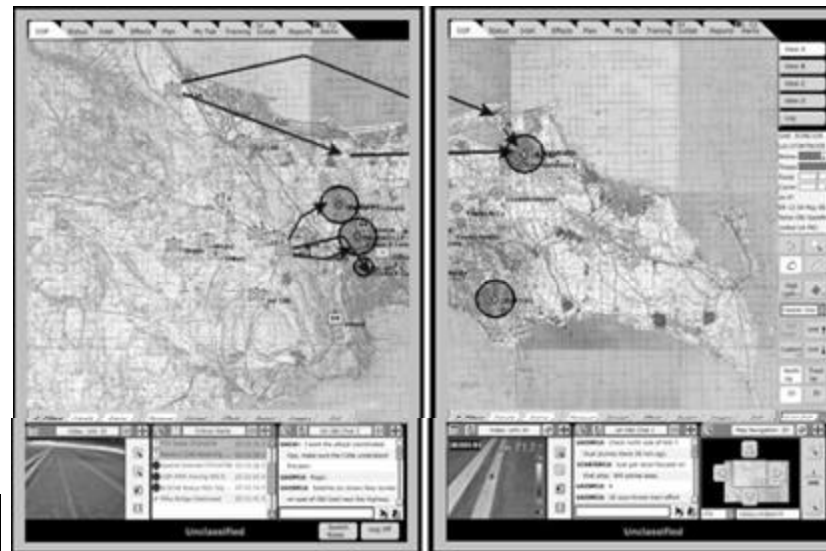




# Battle Command Key Requirements



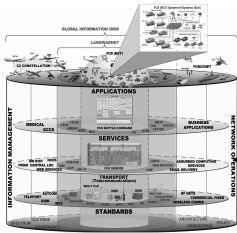
- Common Look and Feel Warfighter Machine Interface
- Full Control and Autonomy of Organic Sensors and Unmanned Systems
- Automated Deconfliction of Blue Forces, Air/Ground Space, and Fires/Munitions
- Automated Planning and Rehearsal Decision Making Process
- Collaboration Toolset (email, chat, and whiteboard, etc.)
- Multi-Levels of Fusion for Situation Refinement at the Platform
- Distributed Fusion Management



- Decision Aiding Supporting C2 of Multiple Unmanned Airborne, Unattended Sensor and Munitions, and Ground Systems by a WF
- Dynamic Sensor Planning, Tasking and Collection Visualization To Support CCIR
- Rapid Battlefield Damage Assessment Tied to Networked Fires
- Execution Monitoring and Dynamic Plan Adjustment Based on Changes in the Current Situation
- Real-time Assessment and Sharing of Combat Power

***FCS Battle Command Provides the Warfighter with a Network Centric Automated Approach***



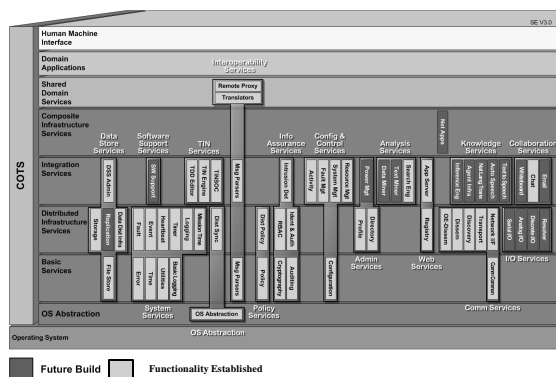


# SOSCOE Key Requirements

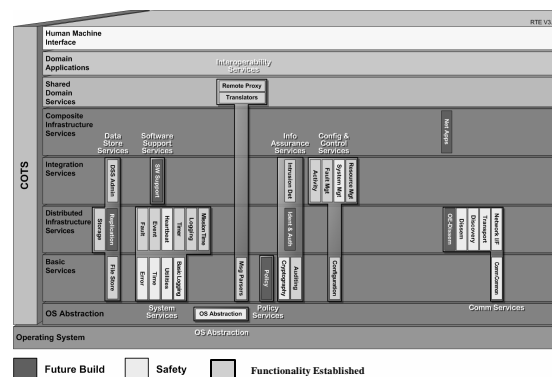


- SoSCOE Major Integration Capability Requirements
  - *Transparent* to the user
  - Common software components to integrate FCS Platforms and across FCS System of Systems
  - Enable net-centric integration within the tactical enclave (wireless, adhoc, dynamic network environment)
  - Work with self forming JTRS network transport to allow for “plug and play” battle command integration
- SOSCOE Feature Requirements
  - Isolate Battle Command Software from the Details of Interaction of the Ad Hoc, Bandwidth Constrained Network
  - Transform data and messages for Interoperability with Current, Future, and JIM Forces
  - Provides collaboration tools for Battle Command and NCES/GIG Interoperability
  - Build Information Assurance to include DoD PKI into the fabric of applications

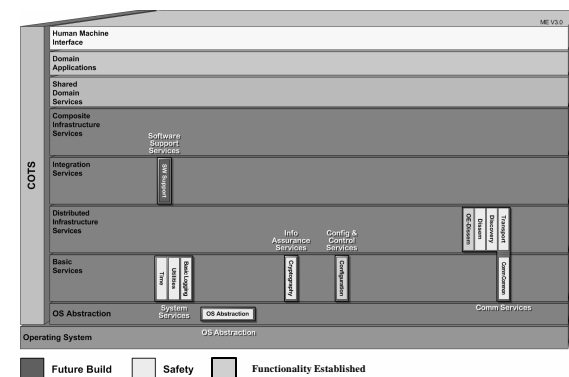
## Standard Edition



## Real Time Edition

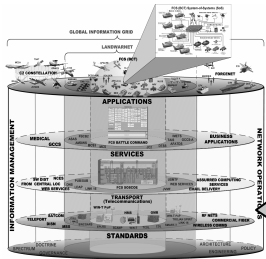


## Micro Edition



**Multiple editions allow SOSCOE to meet performance, scalability, portability, composeability, and interoperability requirements**

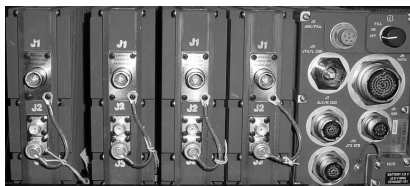




# Transport Layer Key Requirements



- Transport Technical Requirements
  - Utilize JTRS and WIN-T
  - Provide secure communications
  - Connectivity over a 150kmx150km Area of Operations
  - Connect individual soldiers, manned ground vehicles, unmanned ground and air vehicles into the network
  - Operate in an ad-hoc, on the move environment
  - Connect the BCT to higher echelons and the GiG



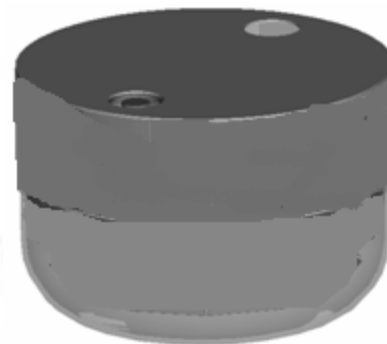
JTRS GMR



JTRS HMS

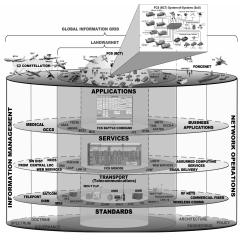


WIN-T JC4ISR



JTRS AMF





# Applying Lessons Learned Across All Layers



**ISR**

**Applications**

**Services**

**Transport**

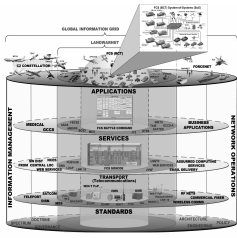
**Standards**

- Counter IED Systems Integration
  - All FCS MGVs will have the Latest in Counter-IED (Jammer) Technology
- Customizable presentation of data through CPOF
  - FCS Warfighter machine interface extending the flexibility of the CPOF presentation for the commander
- Collaboration – a killer “app” from OIF
  - FCS will push capability further down in echelons (i.e. soldiers outside the command post)
  - SOSCOE services will help enable this capability
- Commander’s OTM Transport
  - FCS will extend mobility to the individual platform across the Brigade
  - Also introducing high data rate at the quick halt capabilities to enhance performance across the full spectrum of operations

Everything over IP (EoIP)

- FCS will converge to a pure IP based architecture conforming to DoD standards





## Important “Take-Aways”



- **FCS will move the Army towards a Network-Centric environment that provides information on demand to:**
  - Warfighters
  - Decision Makers
  - Supporting Establishment
- **FCS is being developed as an integrated Network capability at all layers**
  - The network must be viewed as more than the “Transport”
- **FCS Spinouts will provide early introduction of technology to the Current Force**



***FCS is building the future force while enhancing the current force***





## ***MANNED SYSTEMS INTEGRATION***

***COL Charles G. Coutteau***

***Project Manager  
Future Combat Systems, Brigade Combat Team,  
Manned Systems Integration  
PM FCS (BCT) MSI  
Warren, MI  
586-574-8237***

***25 October 2006***

**Approved for Public Release; Distribution is Unlimited. Case GOVT 06-6168. 10 OCT 2006.**

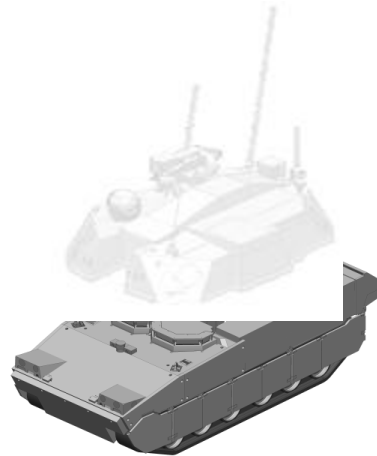


# MGV Platform Overview



## Mounted Combat System

- Provides LOS & BLOS offensive fire capability
- 120mm LW XM360 Cannon



## Non Line of Sight – Mortar

- Close support of tactical maneuver
- 120mm breech-loaded mortar



## Infantry Carrier Vehicle

- Carries 2 Common Crew + 9 member Infantry Squad
- Provides Infantry Direct Fires Support with Mk44 30mm and M240C 7.62mm Coax



## Reconnaissance Surveillance Vehicle

- Primary manned scout platform
- 5m Masted sensor suite
- 2 Common Crew plus 4 Scouts with two Mission Workstations
- Mk44 Weapon System with M240C Secondary



**MGVs Represent 322 Nodes on the FCS Network**



# MGV Platform Overview Cont'd

## Command & Control Vehicle

- Provides command & control to the FCS BCT
- Two-Man Crew and Four-Man Mission Workstation



## Non Line of Sight – Cannon

- Provides mid-to- long range indirect fires support to the FCS BCT
- 155 mm Caliber 38 Cannon



## Medical Vehicle - Evacuation

- Evacuates up to 4 litters or 6 ambulatory casualties
- On board medical equipment and space for medics to perform En Route Care and advanced trauma



## Medical Vehicle - Treatment

- Provides Advance Trauma Medicine and Advanced Trauma Life Support
- Full body access treatment table, quick erect shelter, blood refrigeration, 3D Ultrasound

## FCS Recovery & Maintenance Vehicle

- Primary recovery and maintenance vehicle
- Up-righting, Winching and Towing
- Recovery of disabled vehicle crew





# Common MGVS Subsystems

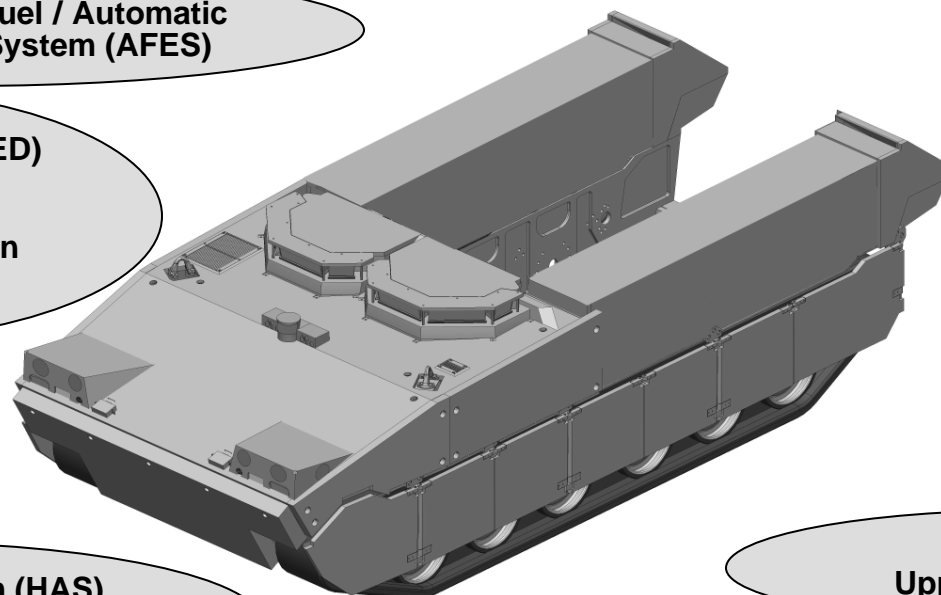
Nuclear Biological Chemical (NBC) /  
 Environmental Control System (ECS)

Defensive Armament  
 System (DAS)

Core Vetronics / Crew Stations

Auxiliary Systems-Fuel / Automatic  
 Fire Extinguisher System (AFES)

Hybrid Electric Drive (HED)  
 Propulsion  
 Engine  
 Li Ion Batteries Traction  
 Drive System



Externally Mounted  
 Close Combat Armament  
 System



5L Common Engine

Hit Avoidance System (HAS)  
 Active Protection System (APS) /  
 Countermeasures (CM)

Structures  
 Upper / Lower Hull

Armor-A + B

Suspension-  
 Hydro-pneumatic Suspension Unit  
 (HSU)  
 Band Track



# Platform Collected Data Shared by All via the Network

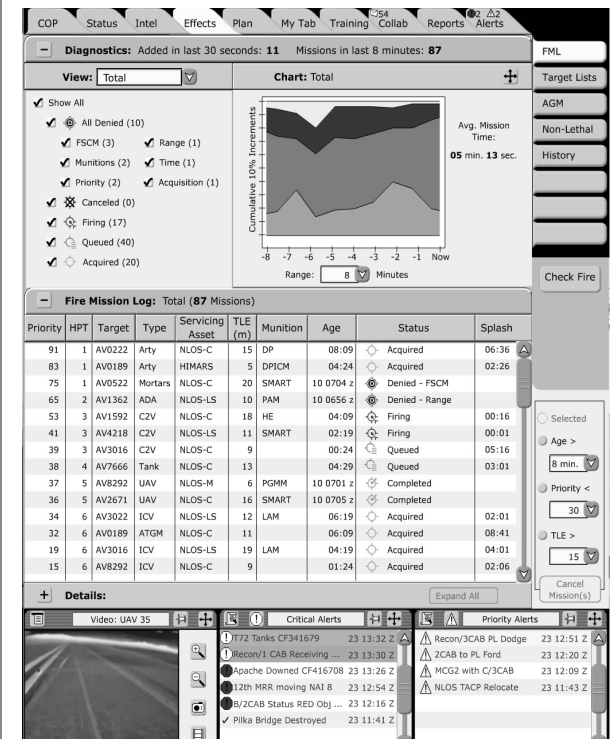
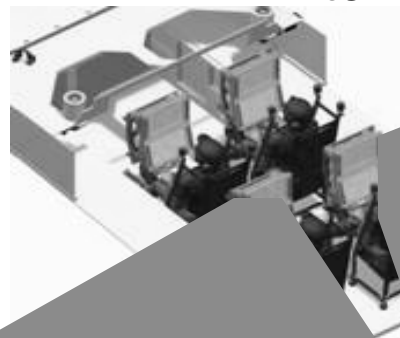


## M1 Abrams Soldier-Machine Interface



**Current Force Platform Sensor Data is available to the Local Commander and Crew**

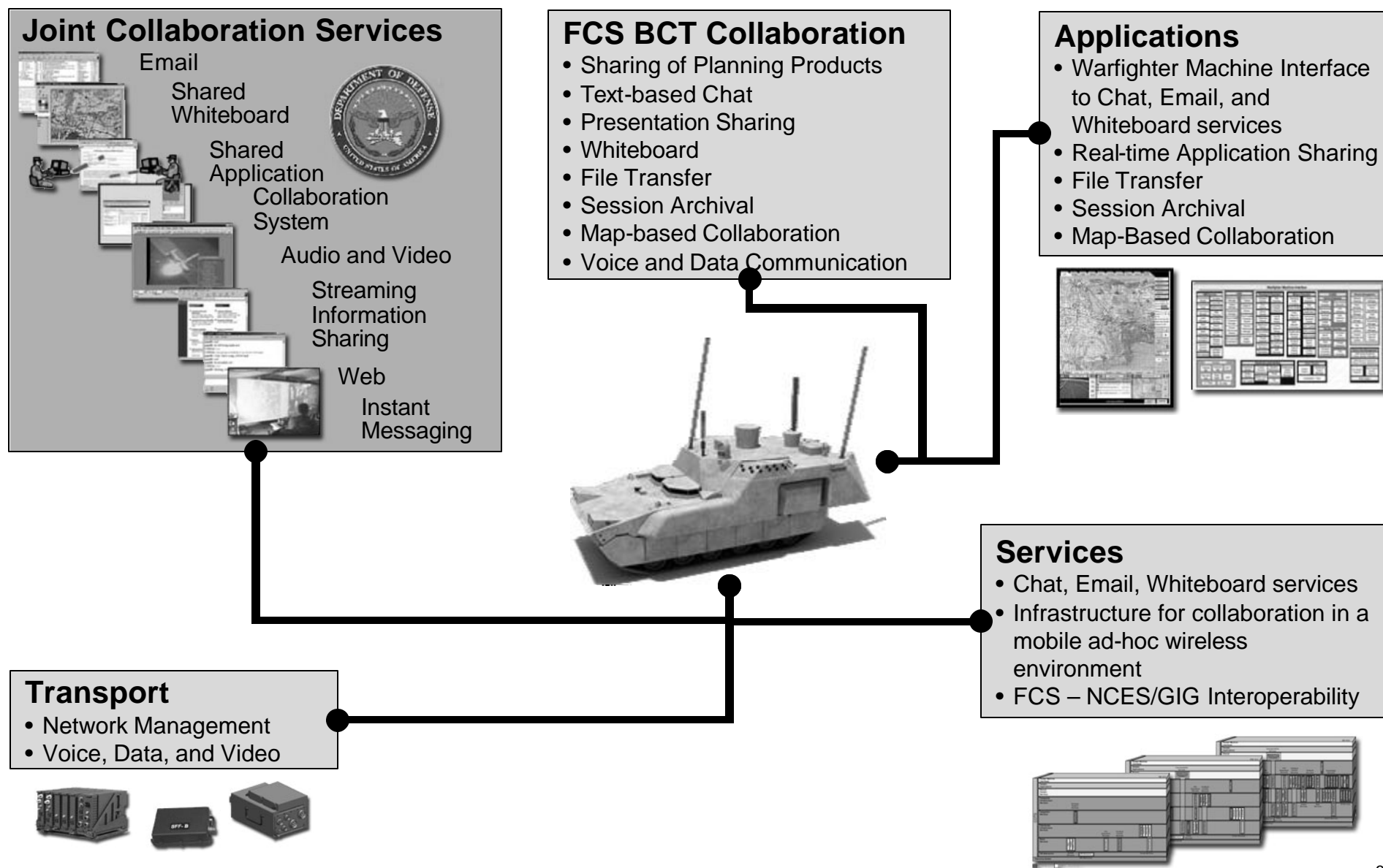
## FCS Warfighter-Machine Interface (C2V Example)



**FCS Sensor Data from all MGv (and other) platforms is available to the Entire BCT**



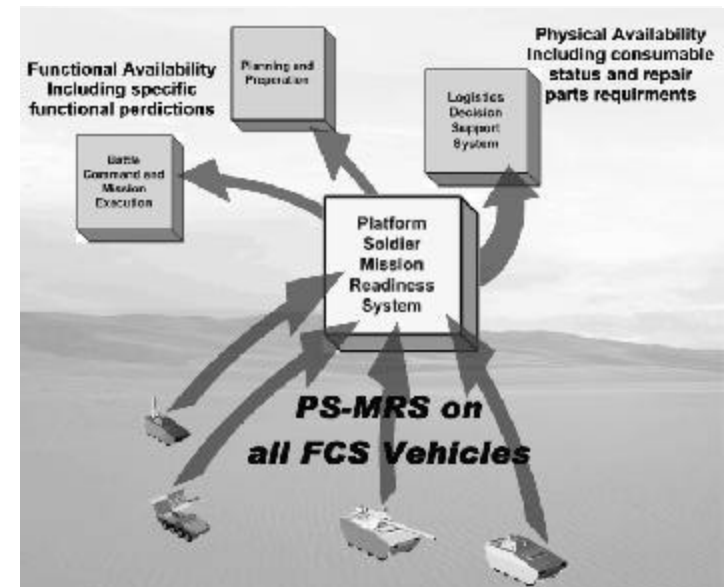
# Distributed Approach to Collaboration





# Platform Sustainment Enablers

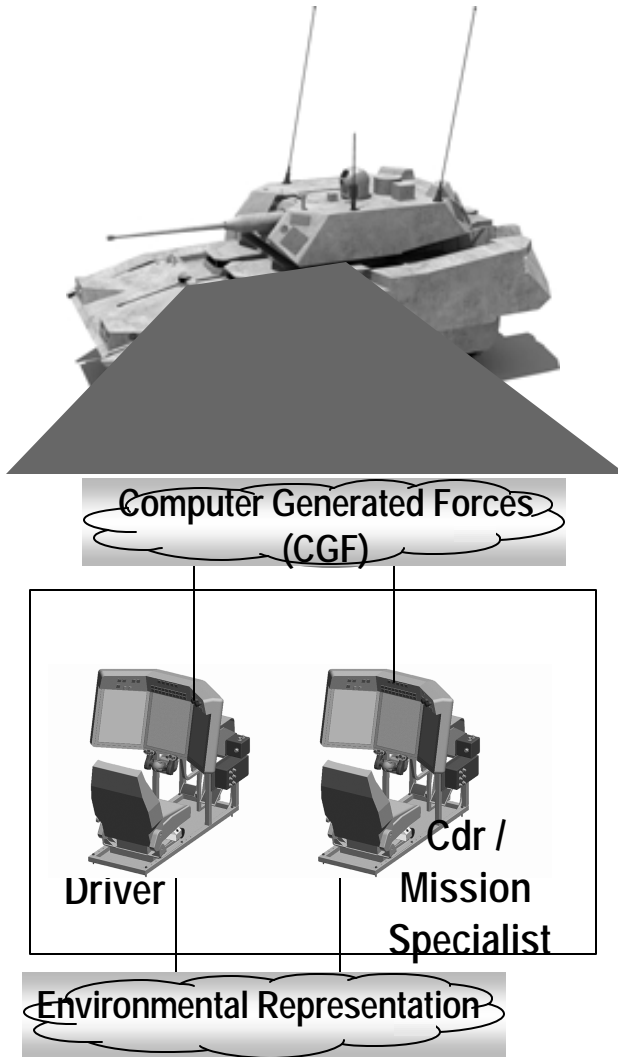
- Networked sustainment enablers integrated into each MGCV platform
- Platform Soldier-Mission Readiness System (PS-MRS)
  - Integrate logistics into the network centric battlefield model: functional availability, physical availability, mission readiness
  - Enable 2 level maintenance concept
- Logistics Decision Support System (LDSS)
  - Logistics Planning and Management
  - Decision Support for Sustainment/Combat Replenishment Operations
  - In-Transit Visibility of Supplies
  - Enables Automated Resupply and Maintenance Planning



## Embedded Platform-Level Supportability Functions



# Platform Embedded Training



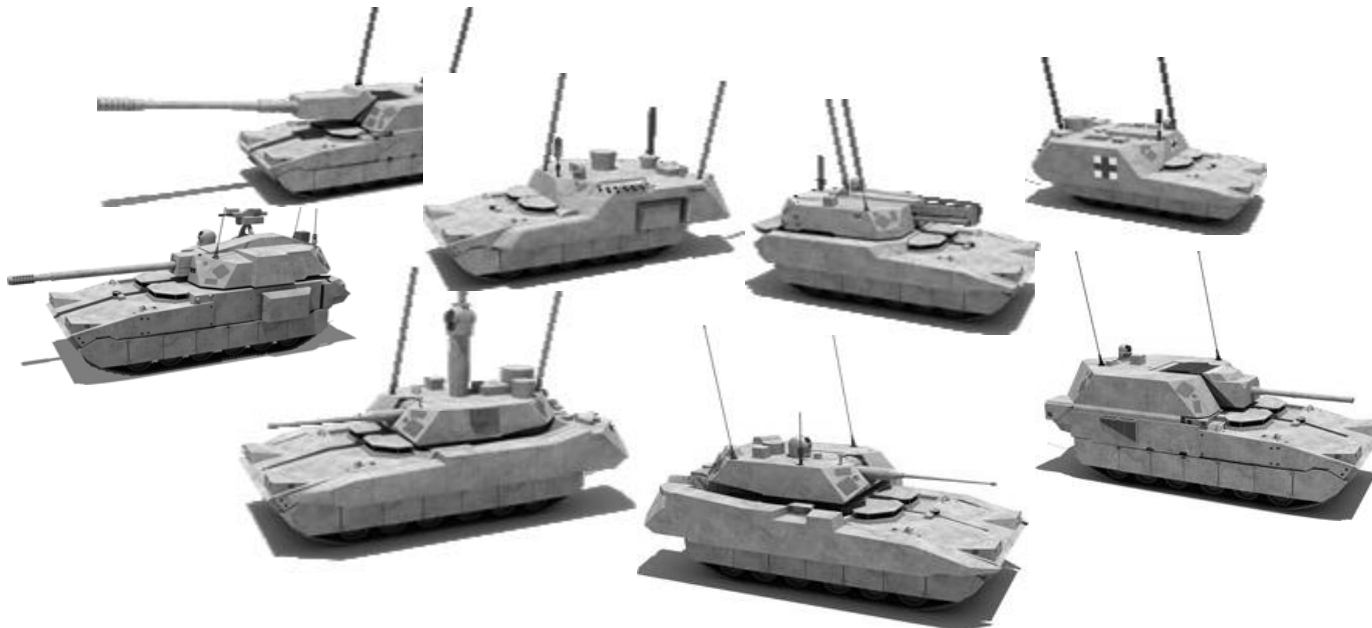
- MGV Platforms will embed training enablers
  - Training is a platform ‘mode’ that is part of our architecture
  - Platform workstations and “network” access enable individual, crew, and distributed collective training
  - Support live, virtual and constructive training
  - Reach-back connectivity to “knowledge repositories”
- Training Support Packages
  - Level V interactive electronic technical manuals
  - Simulation-based training support packages
  - Interactive multimedia instruction
- Enablers include
  - Environmental representations (i.e. terrain, weather)
  - Computer generated forces provide external entities necessary to training tasks (i.e. targets, dismounted soldiers)
  - Transport layer components

**Training Enablers Embedded on All MGV Platforms**



# Summary

- Each MGV platform is a node on the network
- Common Network architecture and components embedded in all FCS Manned Ground Vehicles
- Common look and feel Warfighter Machine Interface







***SPIN OUTS***  
***COL CHRIS DELUCA***

***Project Manager,  
Spin Outs  
PM FCS (BCT)  
703-647-1451***

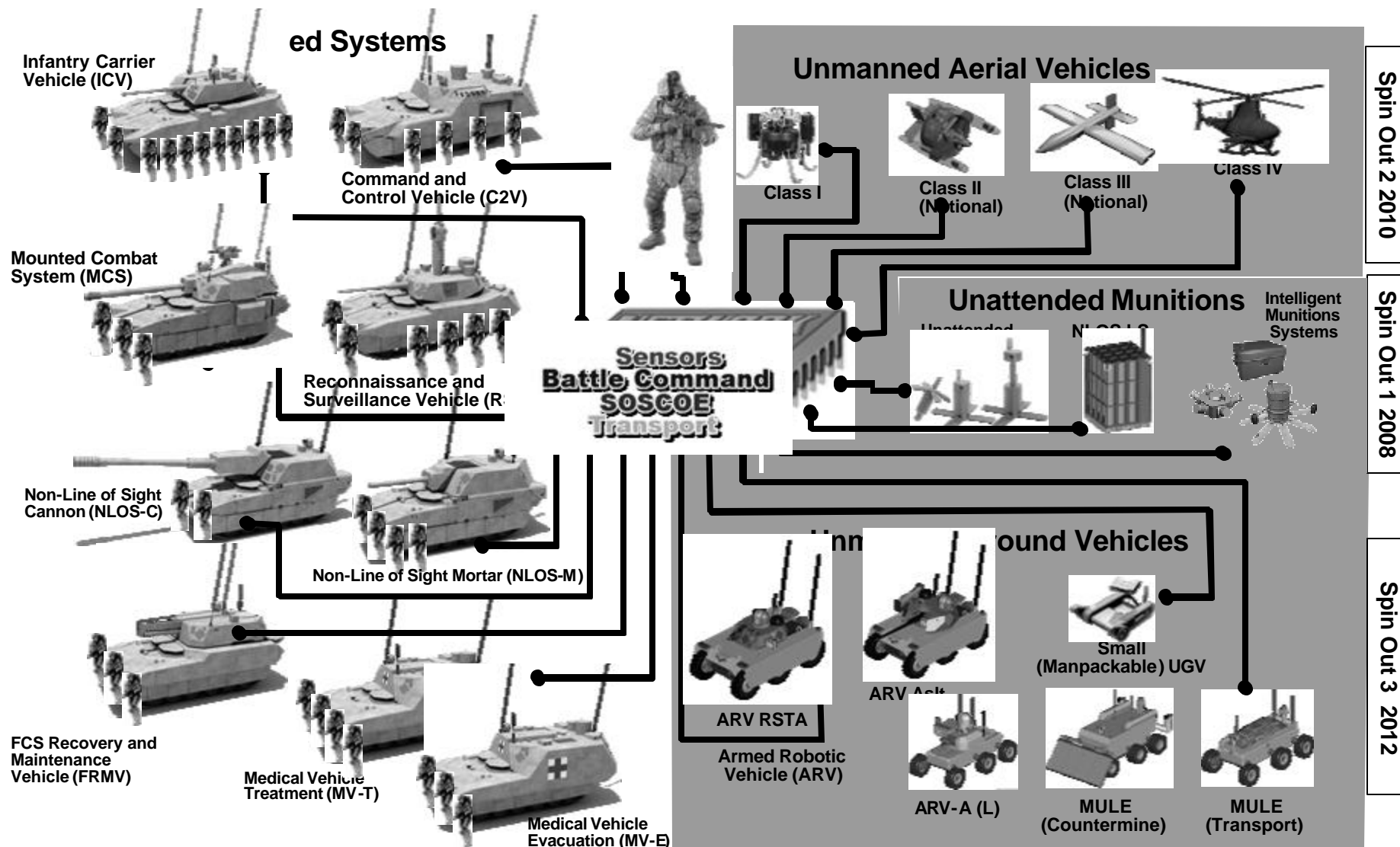
***25 October 2006***

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# FCS Brigade Combat Team... 18 Integrated Systems + 1 Network + 1 Soldier

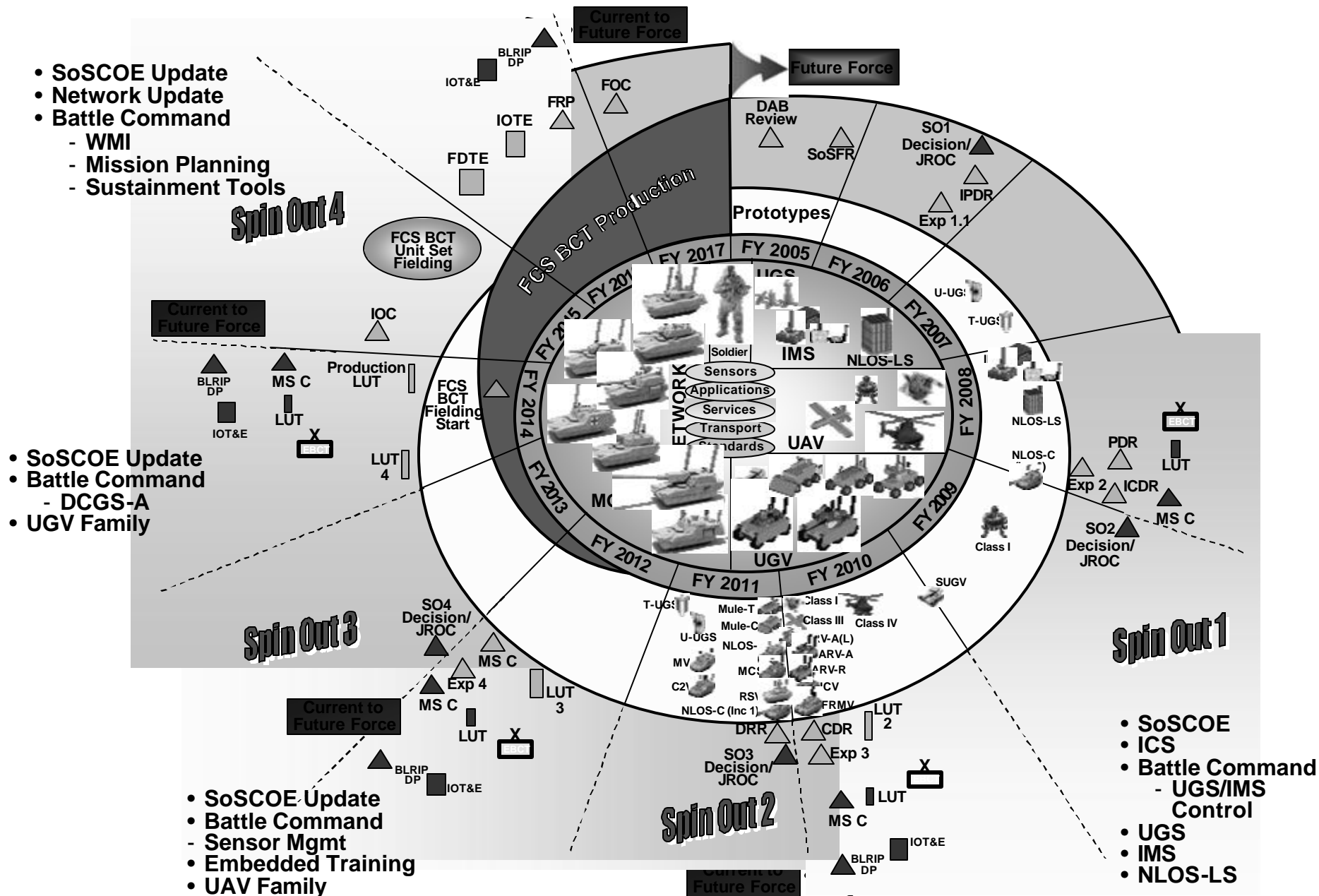
PROGRAM MANAGER  
**FCS**  
BRIGADE COMBAT TEAM  
One Team-The Army/Defense/Industry



## Full Brigade Combat Team... 2014

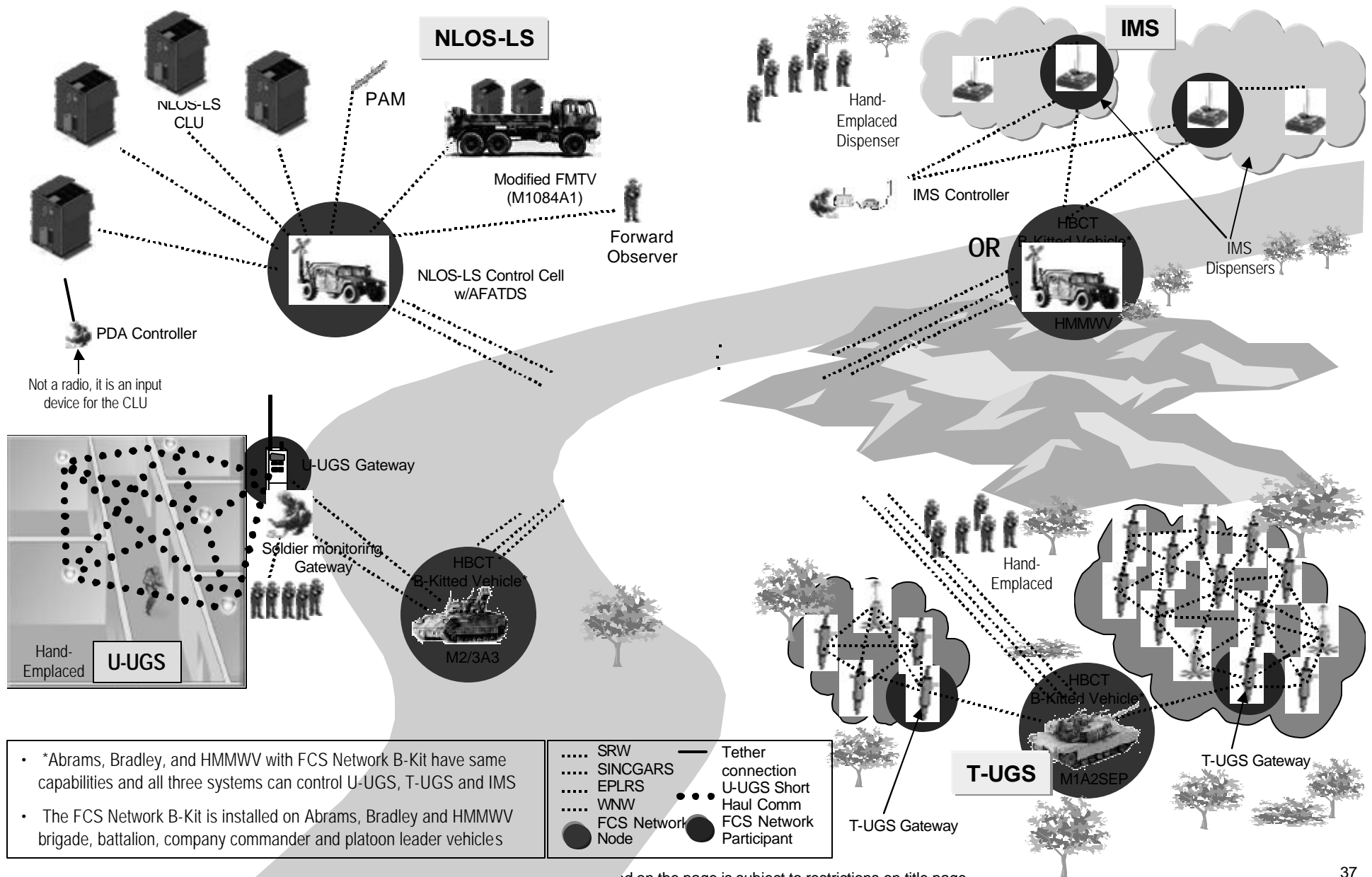


# FCS (BCT) System-of-Systems Schedule



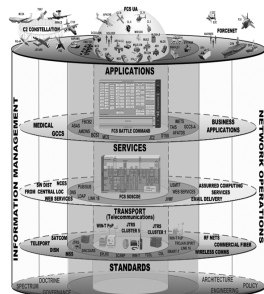


# Spin Out 1 Operational Architecture





# SO1 LUT Network Layers: Building the Network Foundation



## Operational Capabilities

- Enhanced tactical bandwidth
- Initial Network Lethality via NLOS LS and IMS
- Local Surveillance/Target Cueing via UGS
- Enhanced Red & Blue SA exchanged with FBCB2
- UGS/IMS C2 & Level 1 Sensor Data Fusion
- Initial Network Protection
- Initial Foundation for Networked Fires & SA Interoperability
- Improved Force Protection via IMS

## Technical Capabilities



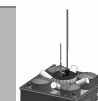
U-UGS



T-UGS



NLOS-LS



IMS

- B-kitted Vehicles: M2A3, M1A2 SEP, HMMWV

### Platforms/Sensors

- FCS BC B1F with Basic Control for UGS, IMS
- FCS BC B1F with Basic Network Planning for UGS, IMS
- Integration and Fusion of UGS/IMS Data (L1F/BSO)
- NLOS-LS controlled via AFATDS

### Applications



XWindows  
Display on FBCB2

- SOSCOE Build 1.8 (3 Editions, Real Time, Std. Edition, Micro)
  - Interop Services
  - Identification and Authentication, Event Logging, Basic Role Based Access Control
  - Services: 13 for Std. Edition, 7 for Real Time, 6 for Micro
- ABCS 6.4 Software Block 2 Services

- Pre – EDM GMR: EPLRS, SINCGARS (voice) SLICE 2.1, WNW 2.0
- Pre- EDM HMS SFF-H, EDM HMS SFF-A: SLICE 2.1(UHF)
- MSRT: SLICE 2.1 (UHF Band)
- SCRS: SLICE 2.1 (L-Band)
- Zigbee
- ICS Type VI



GMR



ICS



HMS

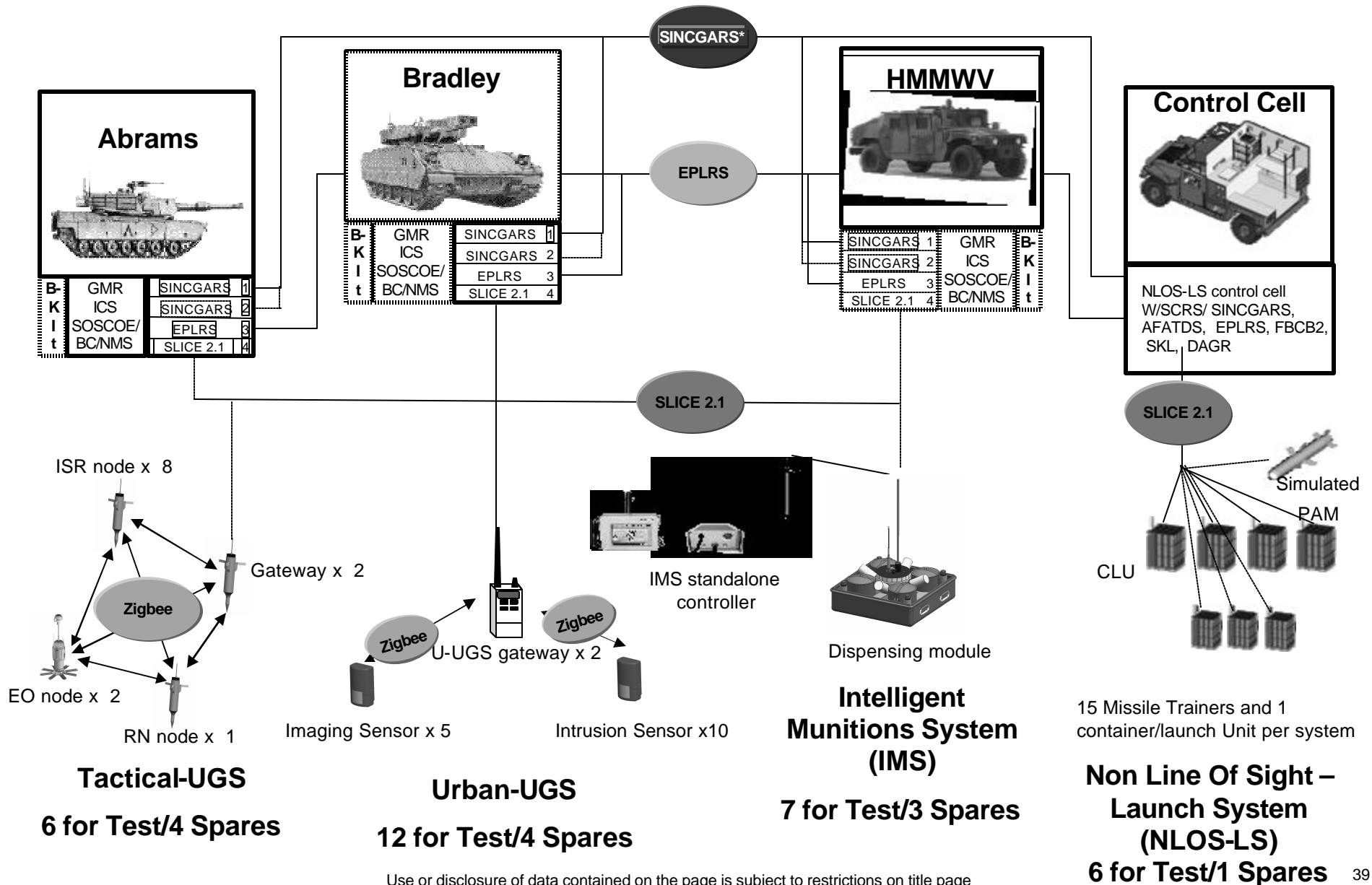
### Transport

- VMF - Variable Message Format
- IPV4 - Internet Protocol version 4
- XML - Extensible Markup Language

### Standards

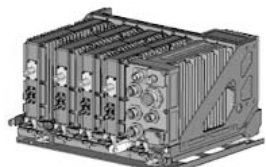


# Spin Out 1 Systems/Products for FY 08 Testing





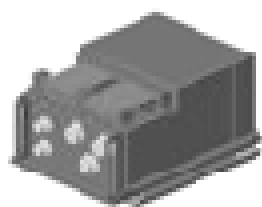
# Spin Out 1 Systems and Capabilities



**JTRS GMR**

## JTRS GMR Radio Hosting FCS Software (SINGARS/EPLRS/SRW/WWN)

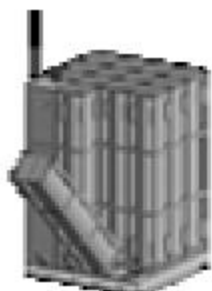
- RF amplifiers and antennas for CF vehicles incl. co-site mitigation for FCS network components
- Interoperate in Current Force EPLRS and SINGARS network
- Manage Red/Black side of JTRS (SRW, WWN)



**ICS  
Type 6**

## Integrated Computer System (ICS) – Type VI

- Networked thru JTRS CL1
- EPLRS Form Factor w/integrated platform LAN router
- Remote & local zeroization of stored data
- Provide firewall between future network and current network
- Leverages Existing FBCB2 monitor for display of FCS BC Applications (IMS and UGS Control)
- Software:
  - SOSCOE v1.8
    - Level 1 interoperability services to: FBCB2 & AFATDS
  - Battle Command Software
    - SDM, L1F & C2 for U-UGS, T-UGS & IMS
    - SOSCOE interoperability services send Fused Sensor data to FBCB2 application for Situational Understanding/COP Display
    - Network Management System - Manage FCS computer/network
    - Partial identification of Battle Space Objects
    - Controls IMS arming, disarming & exchange of control with IMS controller



**NLOS-LS**

## NLOS-LS

- CLU and PAMs
- Transported on FMTV
- JTRS HMS
- Ground launched or fired from FMTV
- Managed/networked via AFATDS between FDC & NLOS-LS CLU
- Secondary control via PDA
- Software Description: SOSCOE 1.8



# Spin Out 1 Systems and Capabilities



## IMS w/JTRS HMS

- Hand emplacement of dispenser
- Dismounted control of IMS in addition to platform control of IMS
- Anti-personnel & anti-vehicle lethality
- Operate in an unattended, unclassified environment for 30 days
- IMS Components have capability to self map, self destruct/deactivate



**U-UGS**

## U-UGS

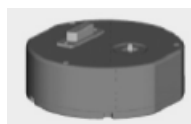
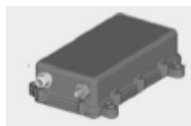
- Hand emplaced
- Intrusion Detection and Imaging Nodes
- Tamper detection
- Software:
  - Gateways include SOSCOE Micro Edition



**T-UGS**

## T-UGS

- Hand emplaced
- Acoustic/Magnetic/Seismic sensing, EO Sensor, Radiation/Nuclear sensing
- Tamper detection
- Software:
  - Gateways include SOSCOE Micro Edition



**JTRS HMS**

## JTRS HMS

- Various Small Form Fit (SFF) configurations
- Using Soldier Radio Waveform (SRW) as the primary transport waveform
- Effort on-going to accelerate hardware deliveries to support SO-1 for UGS, IMS and NLOS-LS
- Gateway to GMR radios at the vehicular platforms



# Current Force Platform Integration

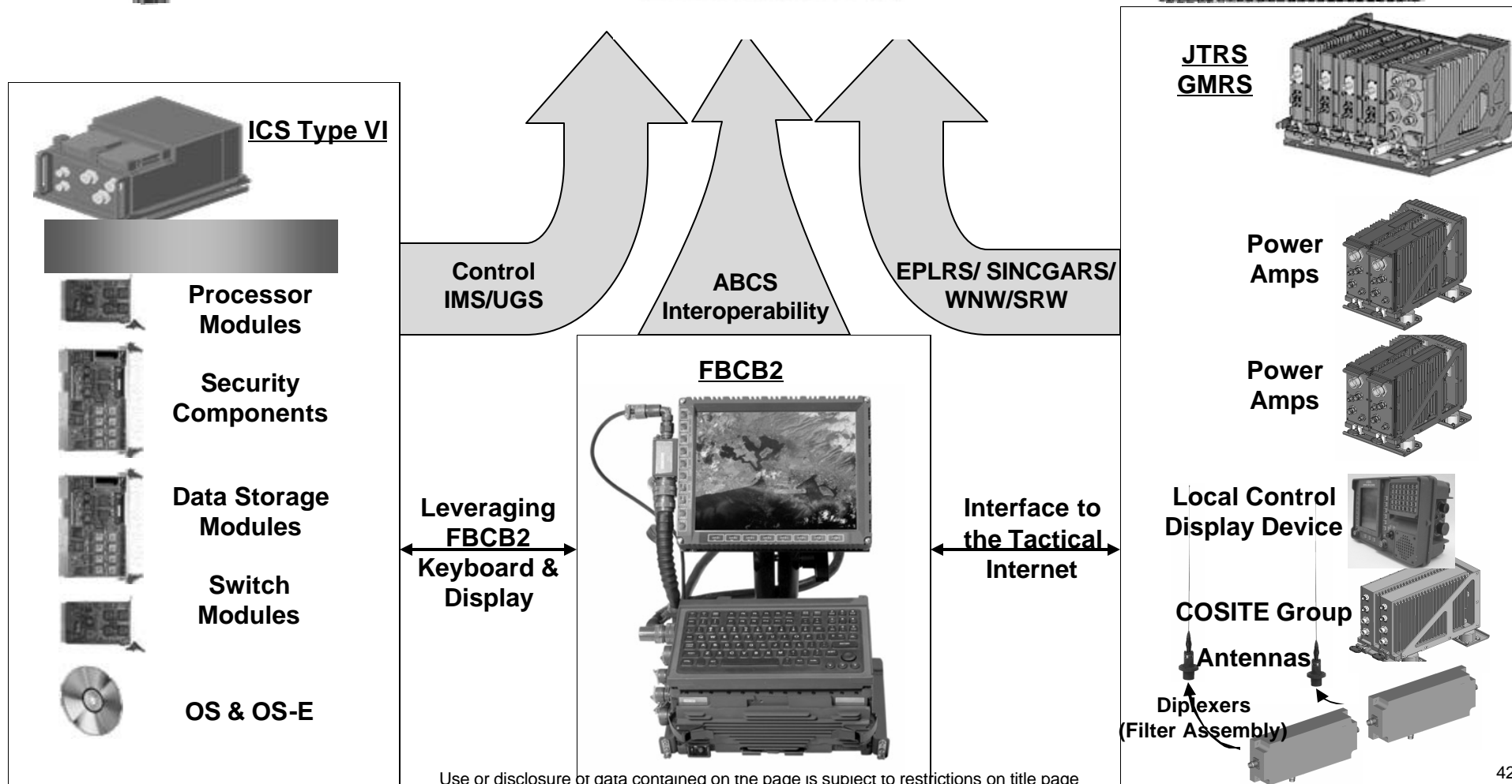
**Bradley**



**HMMWV**



**Abrams**







# ***We Look Forward to Your Questions***

25 October 2006

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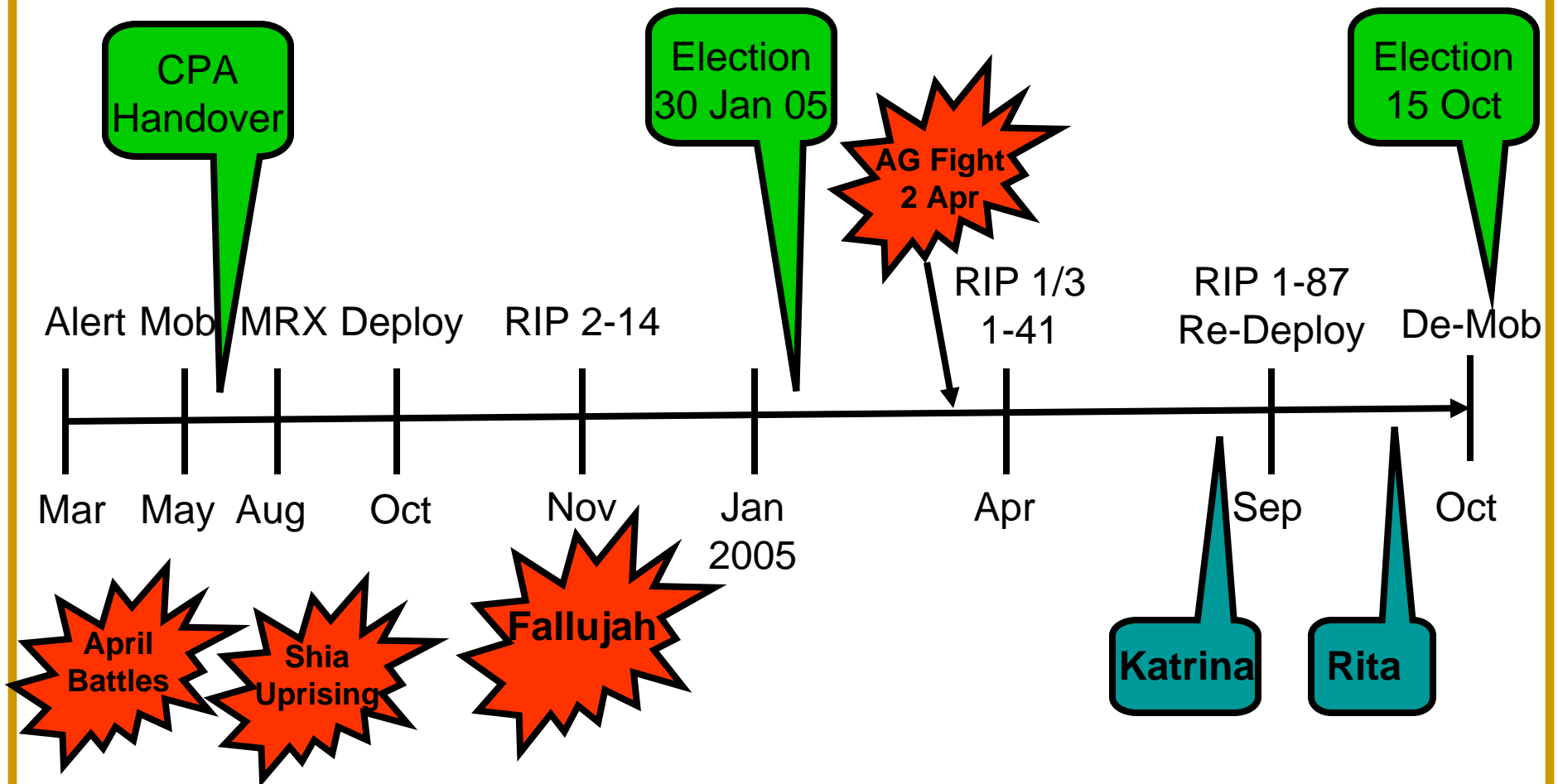
# Heavy Task Force OIF Observations

LTC Tom Plunkett  
Commander, Task Force 1-156 (Geronimo)  
Multi-National Division Baghdad  
Oct 2004 to Sep 2005





# Deployment Timeline



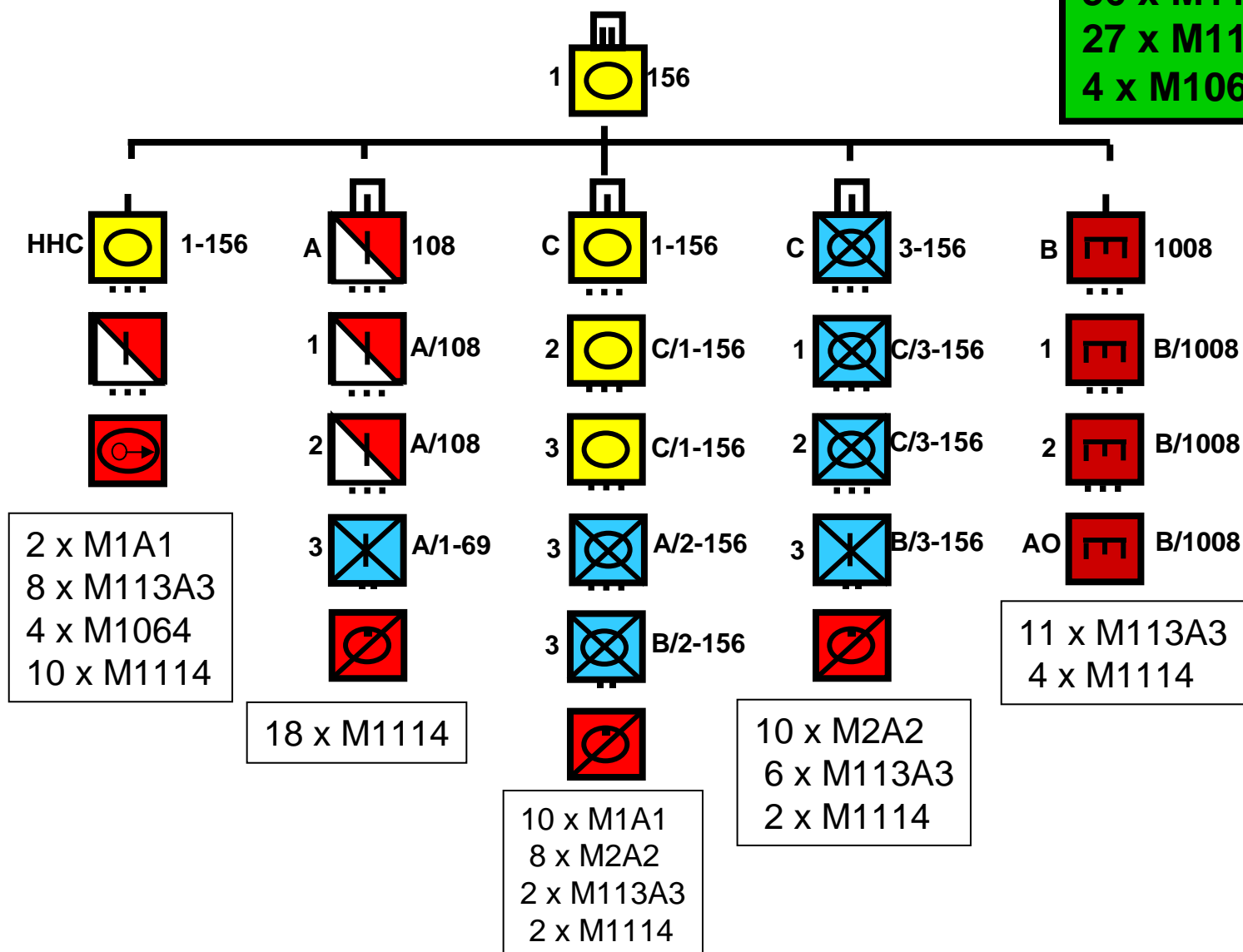




**TASK FORCE 1-156**

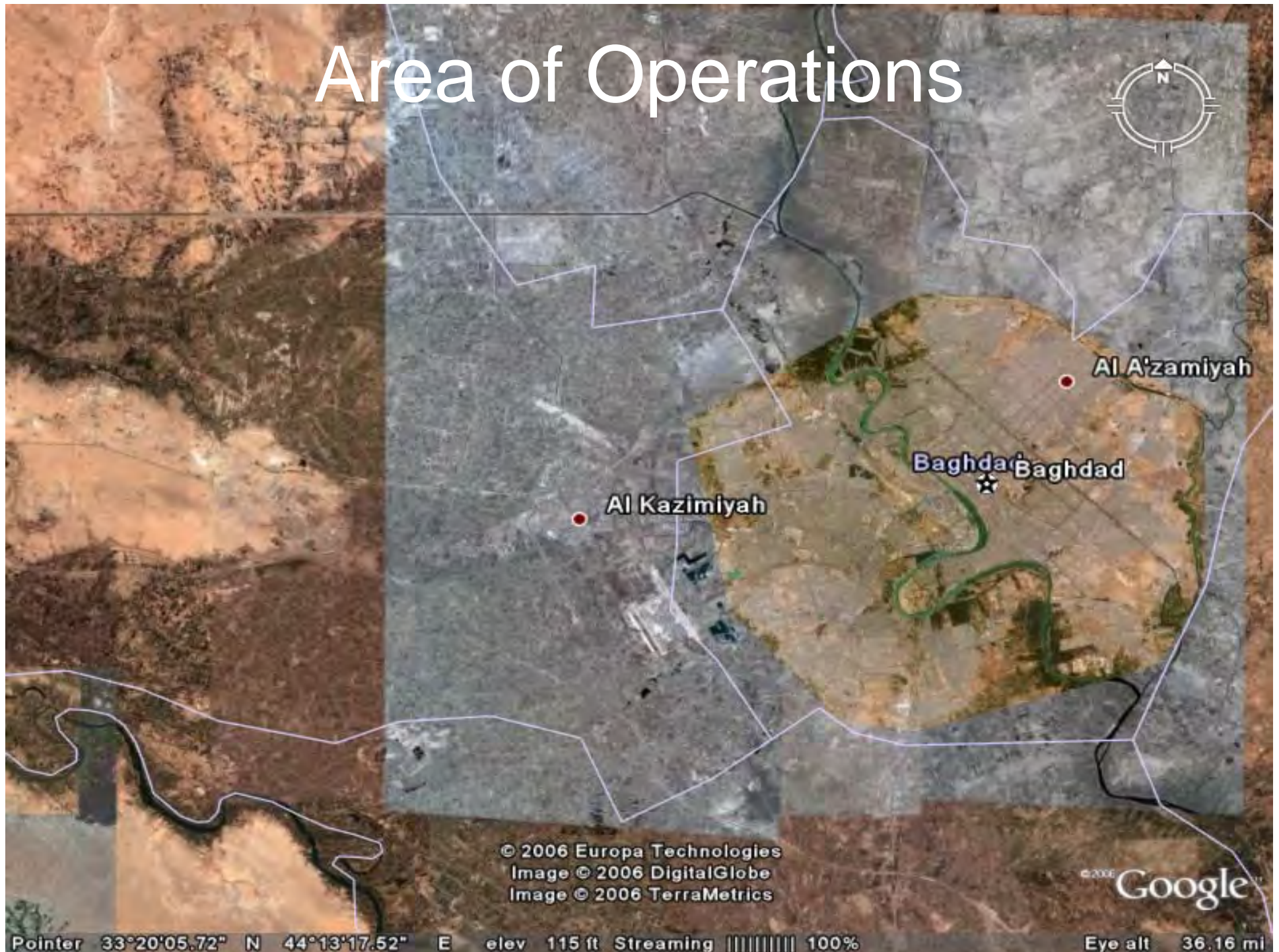
# Task Organization

12 x M1A1  
18 x M2A2  
36 x M1114  
27 x M113A3  
4 x M1064





# Area of Operations





# Rural AOR

30 km x 30 km

Al Kazimiyah



© 2006 Europa Technologies  
Image © 2006 DigitalGlobe

Google

Pointer 33°14'10.80" N 44°07'46.59" E elev 119 ft Streaming ||| 43%

Eye alt 11.80 mi



# Urban AOR



© 2006 Europa Technologies  
Image © 2006 DigitalGlobe

© 2006 Google

Pointer 33°20'05.81" N 44°17'38.69" E elev 123 ft Streaming ||||. 56%

Eye alt 25245 ft





# Combat Action

|                              | <u>OLD AO</u> | <u>NEW AO</u> | <u>TOTAL</u> |
|------------------------------|---------------|---------------|--------------|
| •COORDINATED ATTACK          | 9             | 15            | 24           |
| •DETAINEES                   | 154           | 138           | 292          |
| •FIED                        | 18            | 39            | 57           |
| •GRENADE ATTACK              | 2             | 15            | 17           |
| •IED SUCCESSFUL              | 190           | 115           | 305          |
| •IED UNSUCCESSFUL            | 111           | 42            | 153          |
| •MANPAD ATTACK               | 4             | 0             | 4            |
| •MORTAR ATTACK               | 54            | 3             | 57           |
| •ROCKET ATTACK               | 13            | 0             | 13           |
| •RPG                         | 15            | 23            | 38           |
| •SAF/DRIVE-BY SHOOTING       | 45            | 142           | 187          |
| •UXO                         | 40            | 22            | 62           |
| •VBIED SUCCESSFUL            | 8             | 15            | 23           |
| •VBIED UNSUCCESSFUL          | 4             | 3             | 7            |
| •VCIED SUCCESSFUL            | 1             | 6             | 7            |
| •VCIED UNSUCCESSFUL          | 0             | 2             | 2            |
| •WEAPONS CACHE               | 30            | 4             | 34           |
| •AIF KIA                     | 18            | 34            | 52           |
| •AIF WIA                     | 3             | 8             | 11           |
| <b>TOTAL # ENEMY CONTACT</b> | <b>719</b>    | <b>626</b>    | <b>1345</b>  |
| FRIENDLY KIA                 | 13            | 1             | 14           |
| FRIENDLY WIA                 | 72            | 70            | 142          |
| INTERPRETERS KIA             | 4             | 0             | 4            |
| INTERPRETERS WIA             | 2             | 2             | 4            |









# Heavy Task Force Observations

- Heavy OPTEMPO/Non-Standard Missions: (Combat/Maintenance Losses)
  - M1A1 = 500-750/wk (1/8=9)
  - M2A2 = 250-500/wk (5/0=5)
  - M113A3 = 500-1000/wk (3/1=4)
  - M1114 = 1200-1500/wk (7/2=9)
- M1A1:
  - Survivability & Intimidation Factor
  - Visibility & Urban Operations Limitations
  - Intense Maintenance Operations
  - Mobility Limitations – Rural & Urban
- M2A2:
  - Most Effective All-Around Platform (Weapons/Sites/Dismounts)
  - Some Mobility Limitations – Rural & Urban
  - Reactive Armor (Transmission Issues)
- M113A3:
  - Adaptability
  - Mobility
  - Bolt On Armor (Ramp Issues)
- Cupolas & Shields
- Air Conditioning





# **TASK FORCE GERONIMO WALL OF HONOR**



1LT Chris Barnett  
23 DEC 04



SGT Craig Nelson  
27 DEC 04



SSG Bill Manuel  
10 JAN 05



SGT Robert Sweeney  
10 JAN 05



SPC Alain Kamolvathin  
16 JAN 05



SPC Francis Obaji  
17 JAN 05



SSG Jonathan Reed  
28 JAN 05



SGT Michael Evans  
28 JAN 05



SGT Chris Ramsey  
28 JAN 05



SGT Seth Trahan  
19 FEB 05



SGT Nicholas Olivier  
23 FEB 05



SGT Lee Godbolt  
26 MAR 05



SGT Isiah Sinclair  
26 MAR 05



SGT Robin Fell  
19 MAY 05



SGT Bernard Sembly  
19 MAY 05



SGT David Murray  
9 JUN 05

**THESE SOLDIERS DID, IN THE FALL OF 2004, PRESENT THEMSELVES UPON THE BATTLEFIELD OF IRAQ, IN DEFENSE OF THEIR NATION, IN DEFIANCE OF TERRORISM, AND IN SUPPORT OF THE OPPRESSED IRAQI PEOPLE. HERE THEY FOUGHT, AND HERE THEY FELL. BE IT KNOWN THAT THESE MEN OF HONOR, HAVING PRESENTED THEMSELVES THUS, HAVE BEEN TESTED, AND FOUND WORTHY, AND HENCEFORTH ARE ENROLLED INTO THAT FRATERNITY OF SOLDIERS WHICH THE PROTECTED WILL NEVER KNOW. WE HONOR THEIR MEMORY, AND CELEBRATE THEIR LIVES AS PATRIOTS, WARRIORS, AND FRIENDS.**





# Transforming an Army While at War

**NDIA Combat Vehicles Conference  
24 Oct 2006**

**MG Richard Rowe**

**Deputy Director, Army Capabilities and Integration Center  
US Army Training and Doctrine Command**

***TRADOC: Victory Starts Here !***

"Release of this information does not imply any commitment or intent on the part of the U.S. Government to provide any additional information on any topic presented herein. This briefing is provided with the understanding that the recipient government will make similar information available to the U.S. Government upon request."





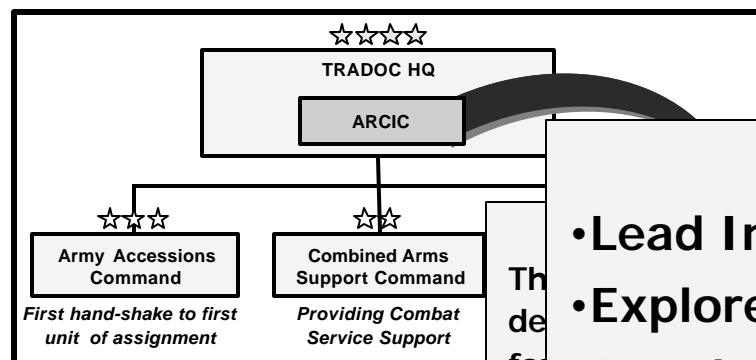
# ***Agenda***

- ✍ ARCIC Overview
- ✍ TRADOC Centers of Excellence (CoEs)
- ✍ Strategy ➡ Concepts ➡ Capabilities
- ✍ Concepts Development and Experimentation
- ✍ The Network--LandWarNet
- ✍ Soldier Modernization
- ✍ Comprehensive Force Protection
- ✍ Future Force Integration Directorate and the Evaluation Brigade Combat Team



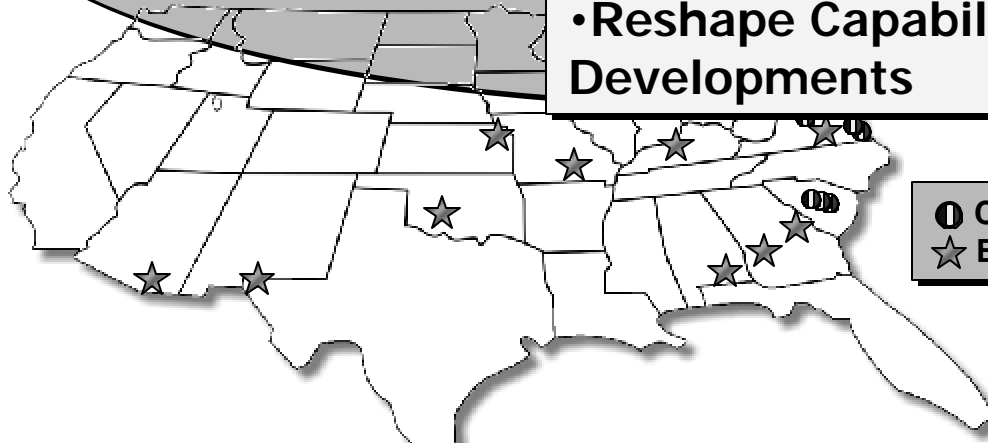
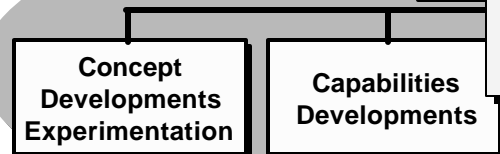


# Army Capabilities Integration Center



## Goals

- Lead Innovation
- Explore and Experiment
- Develop the Future Force
- Integrate the Force
- Strengthen Joint, Interagency, and Multinational Capabilities
- Reshape Capabilities Developments



- ① Combat Developers
- ★ Battle Labs/Combat Developers

Future Force  
Integration  
Directorate

ARCIC  
Forward

External Agencies

Air Land Sea  
Application

JFCOM LNO



Service LNOs

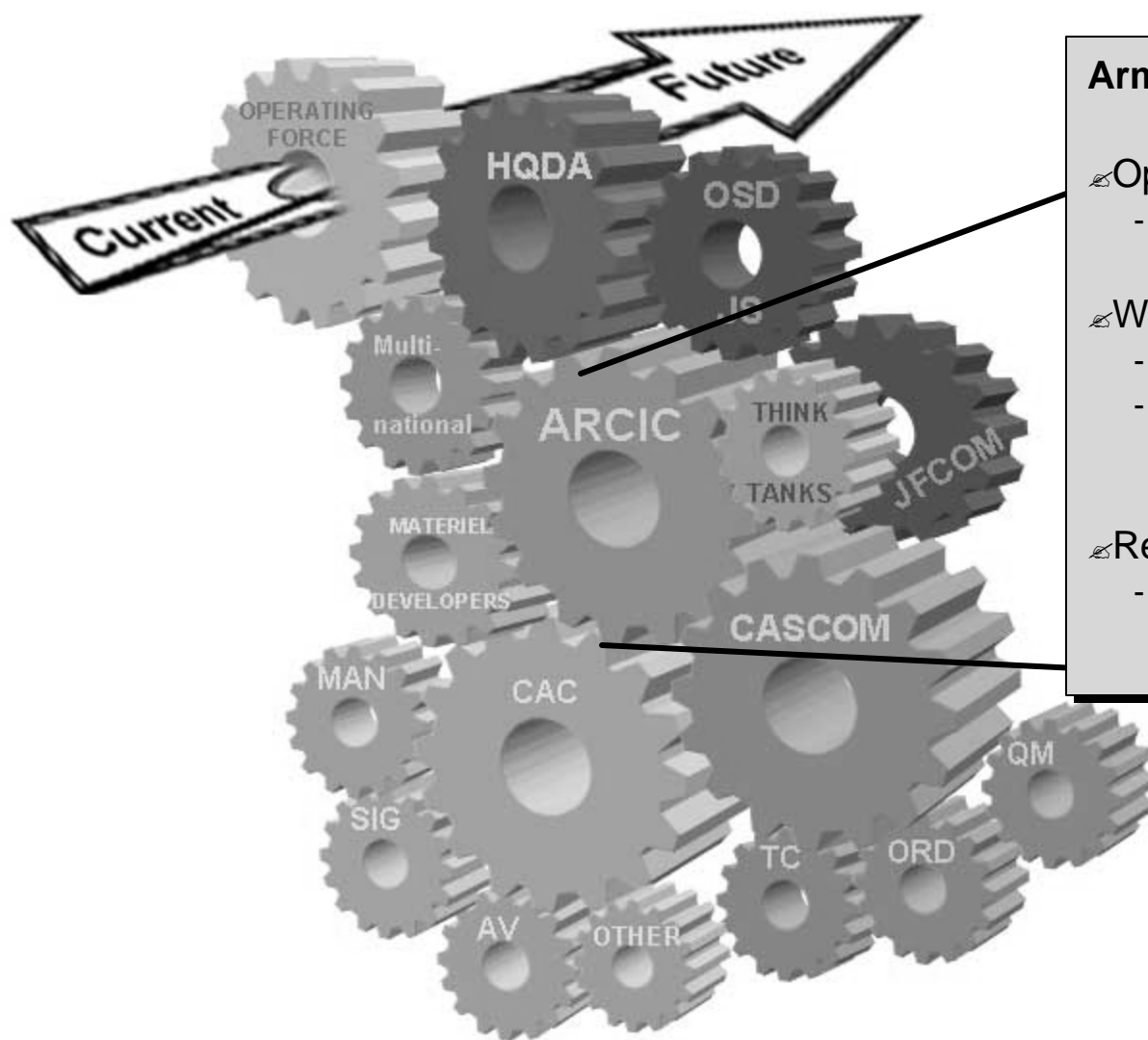
\*\*Initial capability March 07





# ***Driving Change for the Army***

## ***Integrating DOTMLPF for the Operating Force***



### **Army Capabilities Integration Center**

- ✍ Operational Concept Development
  - Illustrate how future forces will operate
- ✍ Wargaming and Experimentation
  - Explore innovative methods
  - Identify and verify solutions for required changes in DOTMLPF
- ✍ Requirements Determination
  - Determine, recommend, and document DOTMLPF changes with supporting analysis



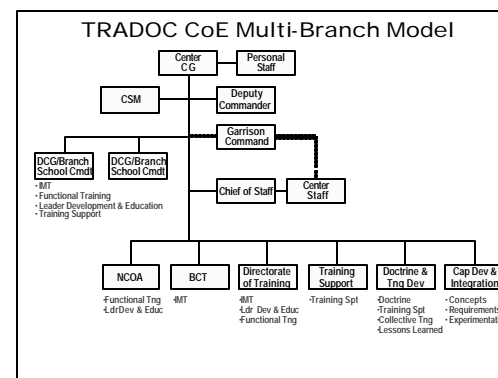


# Transforming to Centers of Excellence

**Center of Excellence Definition:** Designated installation, centered on TRADOC core functions, that improves combined arms solutions for joint operations, fosters DOTMLPF integration, accelerates the development process, and unites all aspects of institutional training to develop Soldiers, leaders, and civilians who embody Army values.

## Objectives

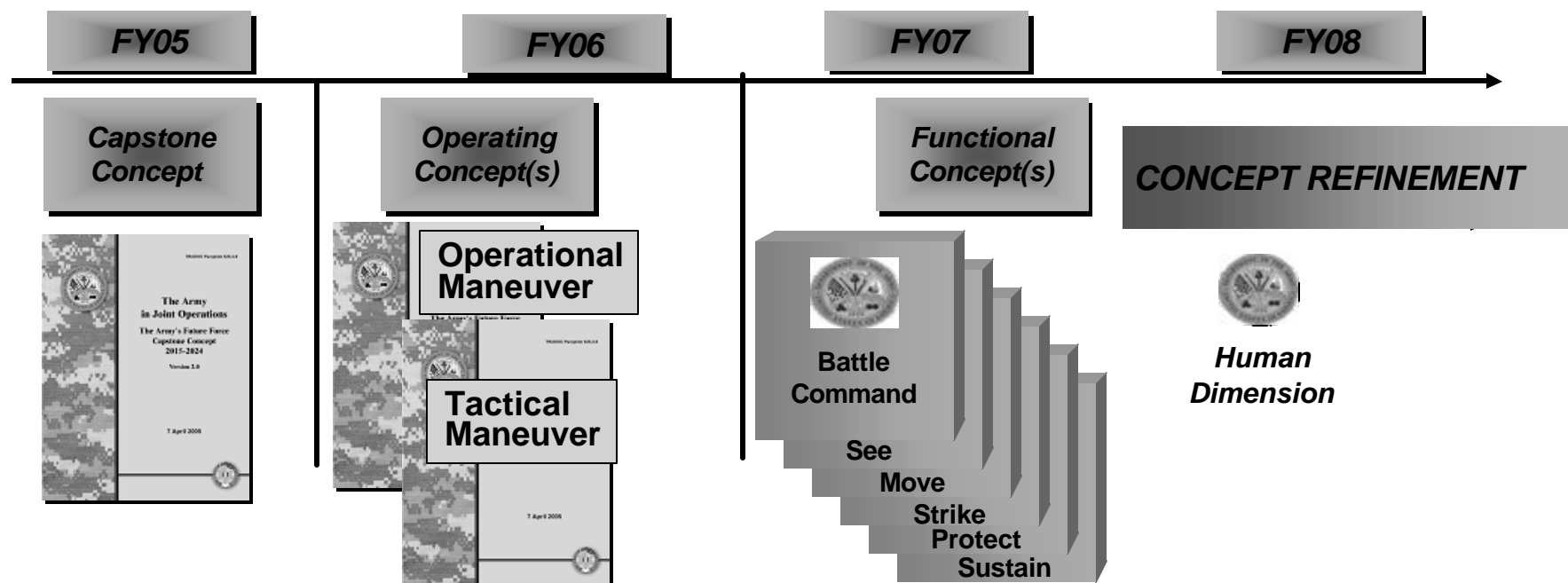
- ✍ Fuse TRADOC functions and capabilities
- ✍ Develop synergy of intellectual capacity
  - Accelerate / promulgate innovation
  - Promote broader leader mindset
  - Stimulate cross-branch exchange
- ✍ Facilitate capability development across DOTMLPF
  - Consolidate to maximum extent possible; leverage “commonness”
  - Facilitate integration of operational lessons learned
  - Facilitate collaboration and interaction within TRADOC and with the rest of the Army and other agencies
  - Facilitate outreach to the rest of the Army







# Army Concept Strategy



- ✗ Capstone Concept intended for experimentation and subordinate concept development
- ✗ Operating and Functional Concepts are further elaboration of Capstone Concept key ideas
- ✗ Concept Capability Plans (CCPs) enable capability development as envisioned in operational concepts
- ✗ Army concepts – nested and support the family of Capstone Concept for Joint Operations (CCJO)

**Wargaming and Experimentation**

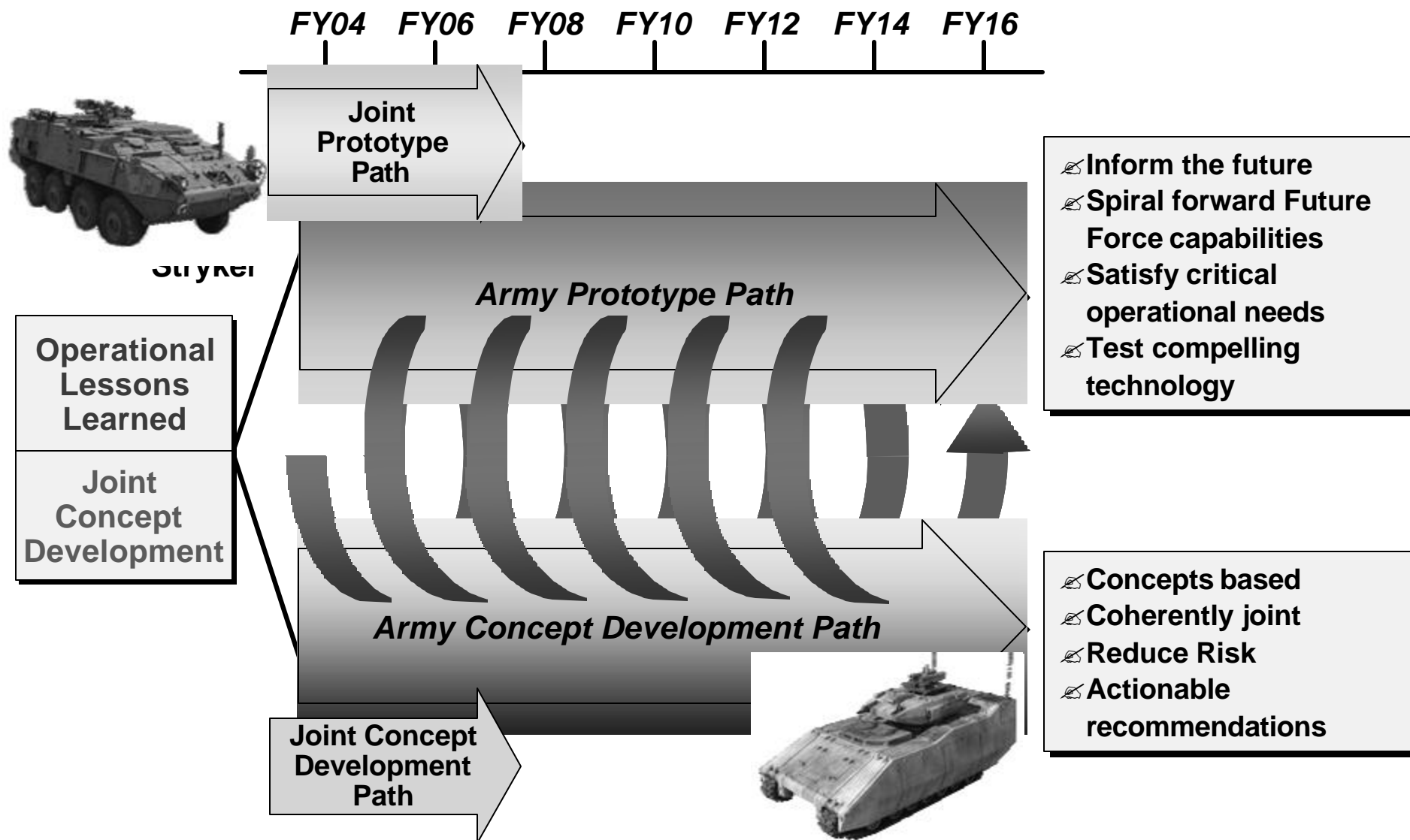
**Concept-Capabilities Gap Analysis**

**A Comprehensive Set of Operational Concepts  
Covers All Warfighting Functions and Missions.**





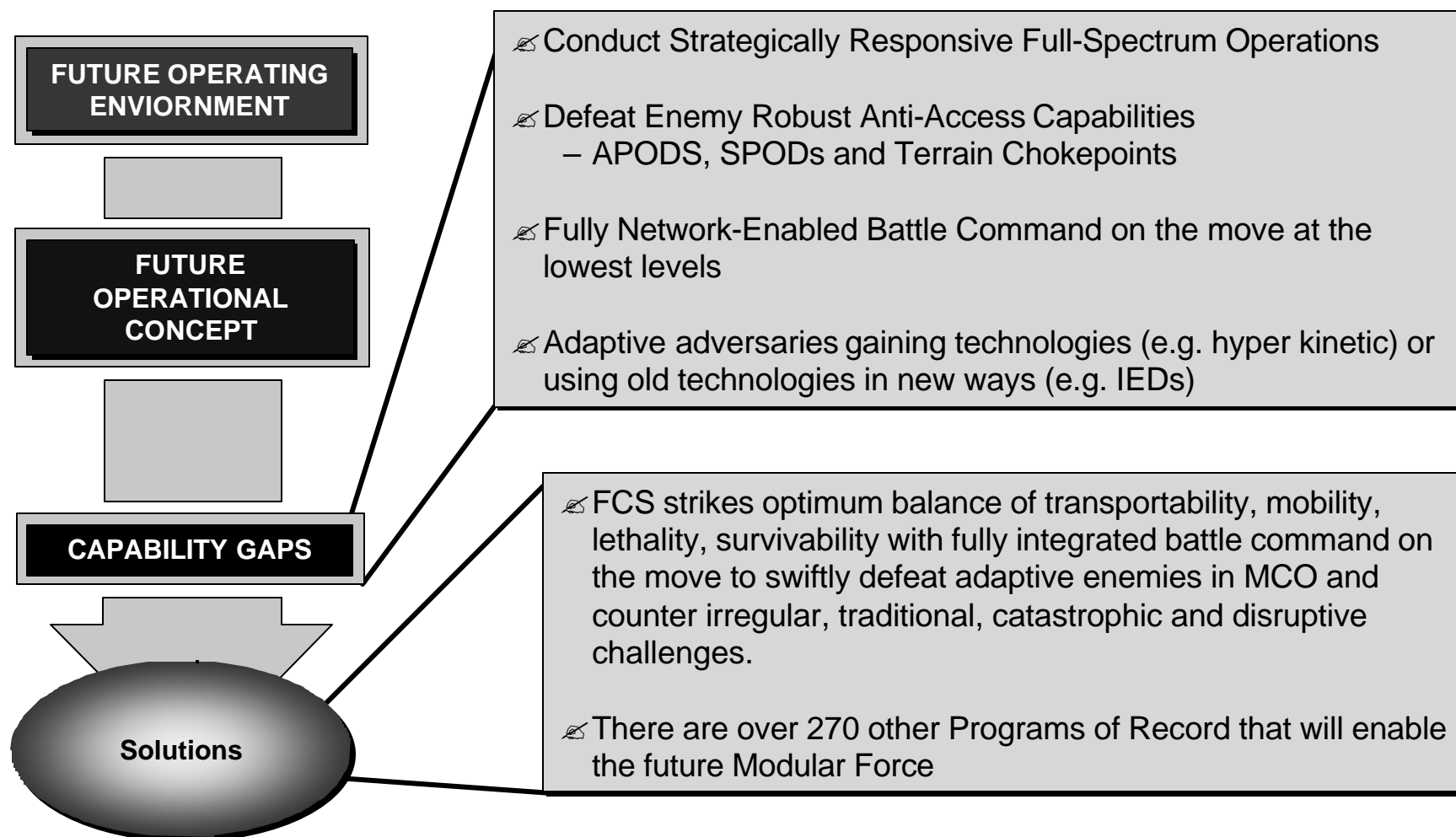
# Concept Development and Experimentation







# Operational Imperative

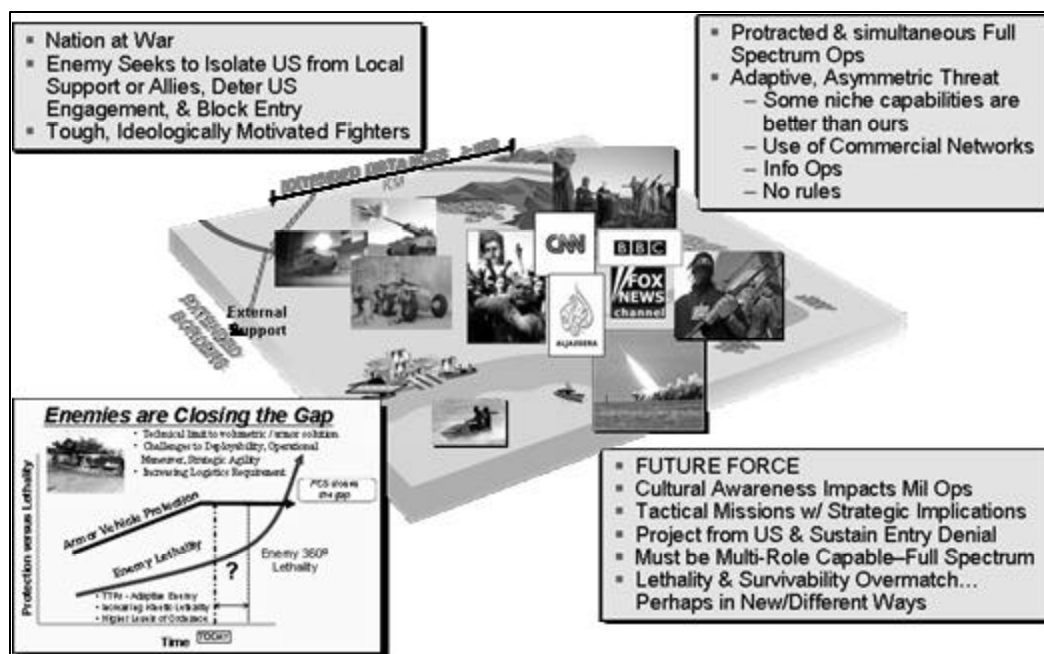






# Why the Joint Force Needs FCS?

- ✍ Joint Operating Environment will continue to evolve: tomorrow's threat is more demanding than today's
- ✍ Must operate across full spectrum (disaster relief to major combat)
- ✍ Provides Joint Force Commanders optimum balance of transportability, mobility, lethality, survivability with fully integrated battle command on the move
- ✍ Hyperkinetic technology advancements will severely challenge passive armor solutions
- ✍ Our wargaming and experimentation, along with real-world experience, demonstrates the potential of network-enabled solutions to address both our current and future capability gaps





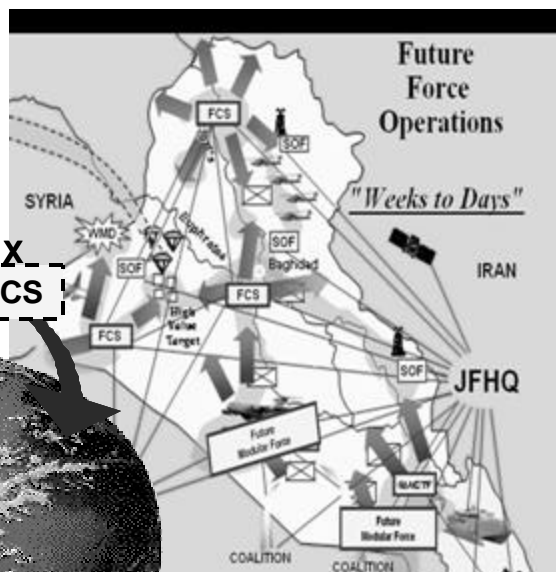


# How FCS Enables Warfighting Capability

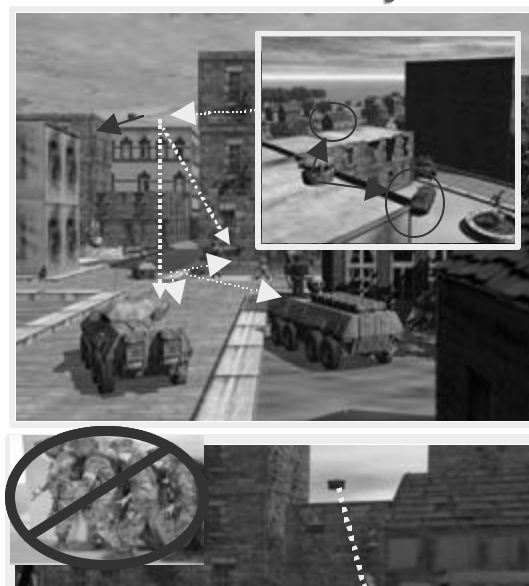
## Strategically



## Operationally



## Tactically



***Close with and destroy enemy forces to seize terrain and dominate the battlefield***

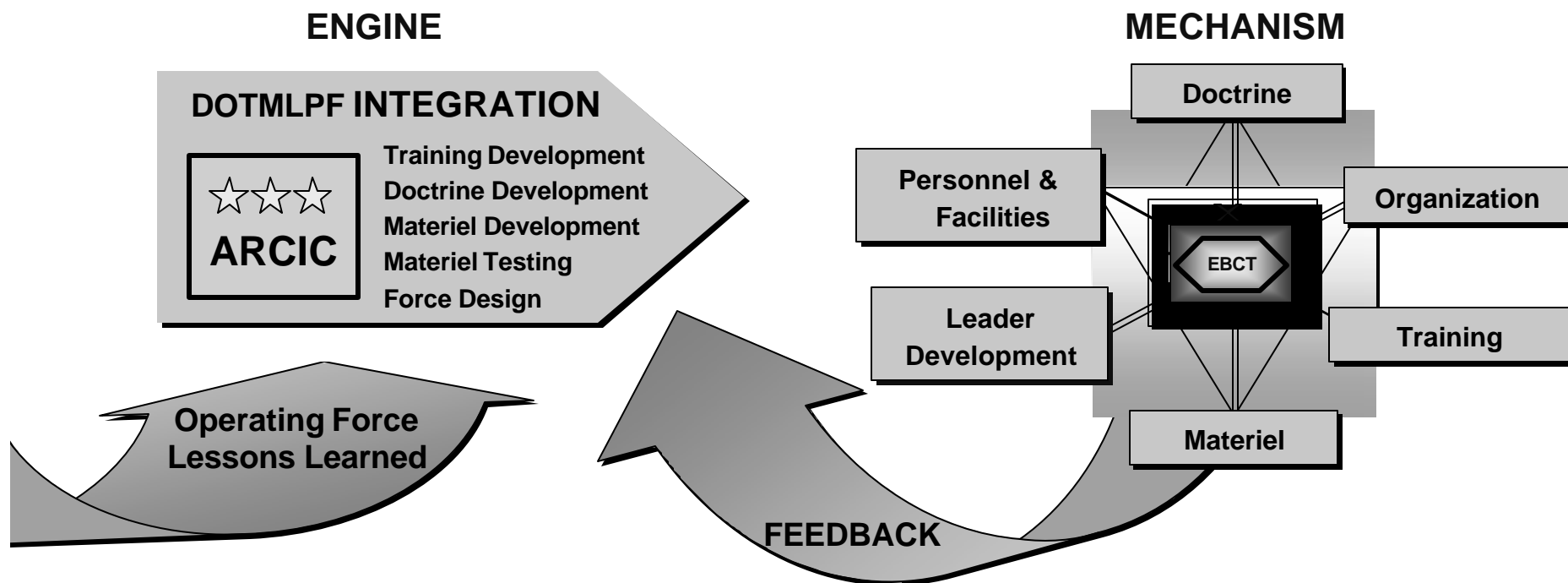
### Seven Key Ideas

- ✍ Shaping and Entry Operations
- ✍ Operational Maneuver from Strategic Distances
- ✍ Intratheater Operational Maneuver
- ✍ Decisive Maneuver
- ✍ Concurrent and Subsequent Stability Operations
- ✍ Distributed Support and Sustainment
- ✍ Network-Enabled Command





# ***Future Combat Systems Integration Mechanism***



## **Future Force Integration Directorate (FFID): Generating Force Throttle**

- ✍ Develop training/leader development products, train and certify Evaluatin Brigade Combat Team (EBCT)
- ✍ Synchronize and coordinate plan for development-related activities (Exercises, Experiments, Test & Evaluation events)
- ✍ Develop Doctrine and Organization products, applying Lessons Learned
- ✍ Update and synchronize systems development documents
- ✍ Serves as the principal interface between Generating Force and EBCT chain of command
- ✍ Exercises Tactical Control (TACON) over the EBCT



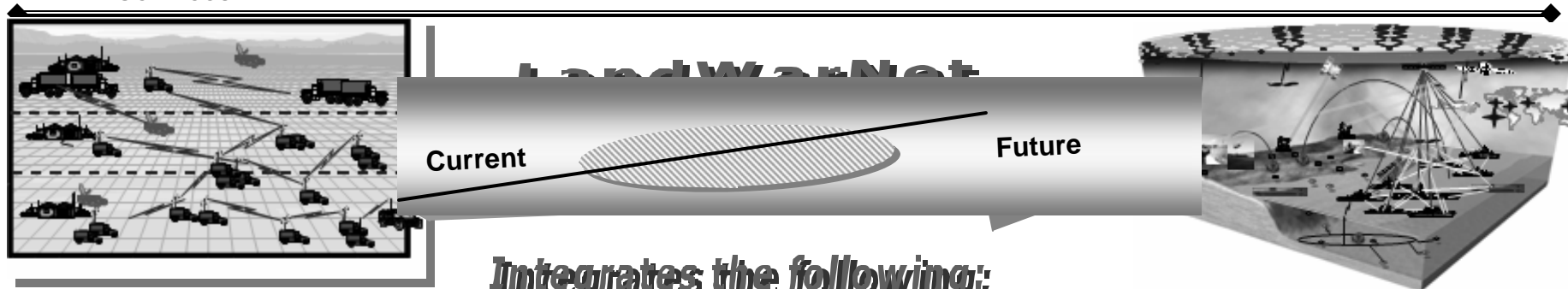


# Defining LandWarNet

- LandWarNet is the Army's contribution to the GIG
- Consists of all globally interconnected Army information capabilities, including:
  - Associated processes
  - Personnel for collecting, processing, storing, disseminating, and managing information
- Supports warfighters, policy makers, and support personnel
- Includes:
  - All Army communications & computing systems
  - Applications
  - Services



*LandWarNet is the means by which the Land Component conducts information-enabled, joint warfighting and supporting operations.*



## Integrates the following:

- |  |  |
|--|--|
| ✂ Static Command Posts (CP) .....            | Comms On-The-Move, Leader-Centric      |
| ✂ Limited Connectivity & Collaboration ..... | Global Connectivity, Collaboration     |
| ✂ Tethered to fixed CP .....                 | Assured Mobile Comms Anytime, Anywhere |
| ✂ Collocated Stovepipe .....                 | One Joint Common Picture               |
| ✂ Army-Centric .....                         | Joint at the Core                      |





**AN/VDR-2 UNIT**  
Unit Requisition

**JAVELIN CLU**  
Per JAVELIN  
Current Fielding

**FBCB2**  
Per FBCB2  
Re-Sync Fielding

**SINCGARS**  
Per TRCS  
Re-Sync Fielding

**M20 Mortar Relocatable Computer Unit**  
ON HAND w/unit

**AN/VDR-2 Mount PM BCT**  
Requestionned

**M13A1 GEPU**  
PM BC Requestionned

**Radio Installation Kits**  
G6DLS JV CFE

**M2 MG & Tripod UNIT**  
ON HAND w/unit

**TWS-H PM BCT**  
Procured

**SPORT (Maintenance) UNIT:**  
X Quantity per ORG

**M89 Mounts**  
PM BCT CFE

**M22 ACADA UNIT**  
Fielding

**PLGR**  
PM GPS  
ON HAND w/unit

**VIS (MC 30)**  
PM BCT  
Procured

**EPLRS**  
PM EPLRS  
Re-Sync Fielding

**M6 CMO**  
PM BCT: 6 per RV  
Procured

**M240 & 240 MG UNIT**  
Unit Requisition

**DVE**  
PM BCT  
Procured

**M11 DAP UNIT**  
Unit Requisition

**M13A1 GEPU**  
PM BC Requestionned

**Radio Installation Kits**  
G6DLS JV CFE

**M20H UNIT**  
ON HAND w/unit

**MK-19 Gren. Launch UNIT**  
ON HAND w/unit

**Soldier Equipment Unit**  
ON HAND

**Only 50% of the BCT's 108-ICV's will be equipped with FBCB2.**  
\* Re-Sync Fielding: Based on FORSCOM Re-Sync Plan (24 May)

## Power Supply, Maintenance, Supply

13

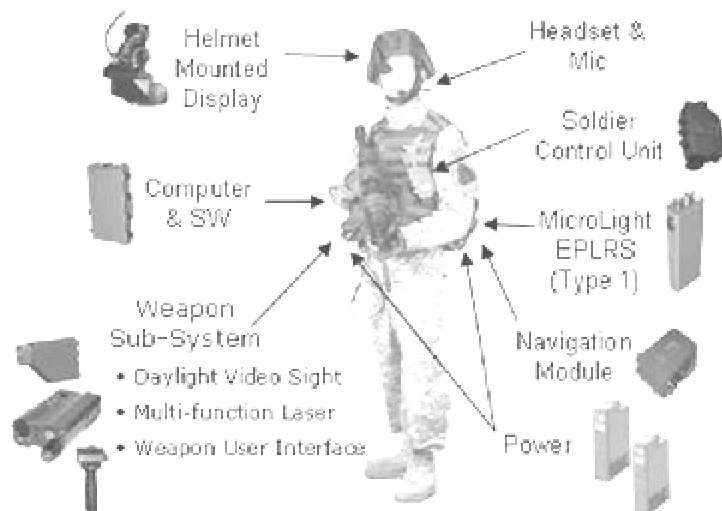




# Land Warrior and Ground Soldier System

- Integrated, Modular, Scaleable System
- Capability Tailored to Duty Position
- Voice/Digital Communications to current and future platforms
- Connects Soldiers And Leaders to Tactical Internet

## Squad Leader and Team Leader



## Commander's Digital Assistant

- Not Currently Integrated With Land Warrior
- CO CDR Level Only (Carried by RTO in Assault Ruck)
- Provides Over The Horizon Communications



## Vehicle Integration Kit provides:

- Gateway to Tactical Internet
- Land Warrior II Network Hub
- Soldier Battery Charger
- Combat Net Radio System - Voice/Data
- Video Display Terminal

*Combat Platform  
Considerations*





# ***Comprehensive Force Protection Initiative (CFPI)***

**- CG TRADOC directed effort initiated 17 Nov 2005**

**✍ ARCIC lead with Materiel Developer, Test, and Acquisition Communities**

**✍ Objectives:**

- identify OIF/OEF force protection gaps**
- identify on-going efforts**
- develop recommendations for additional, immediate actions**
- develop an interim requirements strategy to enhance force protection**



**ed Soldier  
y And  
bility**



**Enhanced Vehicle Lethality And Survivability**

***Enhanced Force Protection in the Current and Future Modular Force***





## ***Summary: What We're Doing for the Army***

- ✍ Supporting Soldiers Today and Preparing for the Future
  - ✍ Integrating the Force
  - ✍ Implementing the Army Modular Force
  - ✍ Powering Joint Interdependencies
- ✍ Leading Joint Wargaming, Experimentation and Concept Development

***Developing a Campaign Quality Army with  
Joint and Expeditionary Capabilities***



# **Generating Combat Power Across the Continuum of Operations**

**Donald F. Schenk  
BG, USA (Ret)**

**[schenkdf@netscape.net](mailto:schenkdf@netscape.net)  
(248) 840-1671**

**[dschenk@spectrumgrp.com](mailto:dschenk@spectrumgrp.com)  
(888) 683-4222**



# **Combat Vehicles Division**

## **Objective**

**The primary objectives of the Combat Vehicles Division of NDIA are to:**

- Enhance the security of the United States by promoting communications and interaction between defense industry and government in the area of combat vehicle activities.**
- Serve as an effective communications vehicle for the exchange of views and information between government and industry on matters of common concern.**
- Foster mutual understanding and effective working relationships between government and industry in order to achieve a sound body of government policy and procedures which will serve both the security objectives of the United States as well as the commercial interests of its industry.**
- Provide government with industry advice on government policies, practices and procedures and industry's needs and problems within the Divisions purview.**
- Promote natural exchanges between the Defense Department, government agencies and industry, of information relating to the design, development, acquisition and support of vehicles and vehicle systems employed in land and amphibious military operations.**





# <sup>7</sup> ~~1996~~ Combat Vehicles Conference Symposium Overview



The reality of **reduced military spending** continues to be felt throughout the combat vehicle community, particularly as the orientation from the possibility of a major war in Europe to that of response to **multiple and varied contingencies** becomes more clearly focused. Major programs, force size, the relative mix of active and reserve components, and **operating tempo** are all affected. Meanwhile, the Army is moving toward its **Force XXI** posture. This conference will focus on the impact of Force XXI on the combat vehicle community with concentration on the key elements of mobility, lethality and survivability.



# Heard Here—26 Oct 99

## *Full Spectrum Threat*

### **Forces**

- Paramilitary forces
- Special Police
- Terrorists
- Militia
- Motorized Infantry
- Mechanized Forces



**Potential to  
Escalate into  
MTW**

### **Tactics**

- Unconventional, terrorist and guerrilla operations
- Use of sanctuaries
- Dispersed, decentralized, distributed operations
- High-tempo, limited duration combat
- Sophisticated ambushes
- Exploit constraints of US cultural biases

### **Equipment**

- Small arms
- Automatic arms
- ATGMs
- Light-, Medium Armored Vehicles
- Early Gen Tanks ➡
- Mortars
- Mines
- Info technology
- Night Vision
- WMD
- “Black Eagle”

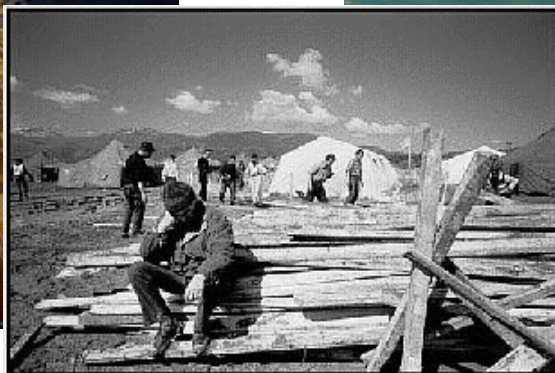
**Major Theater War Risk remains and is enhanced even as SSCs become more frequent and challenging**



# Terrain Varies

**Open & Rolling**

**Complex**

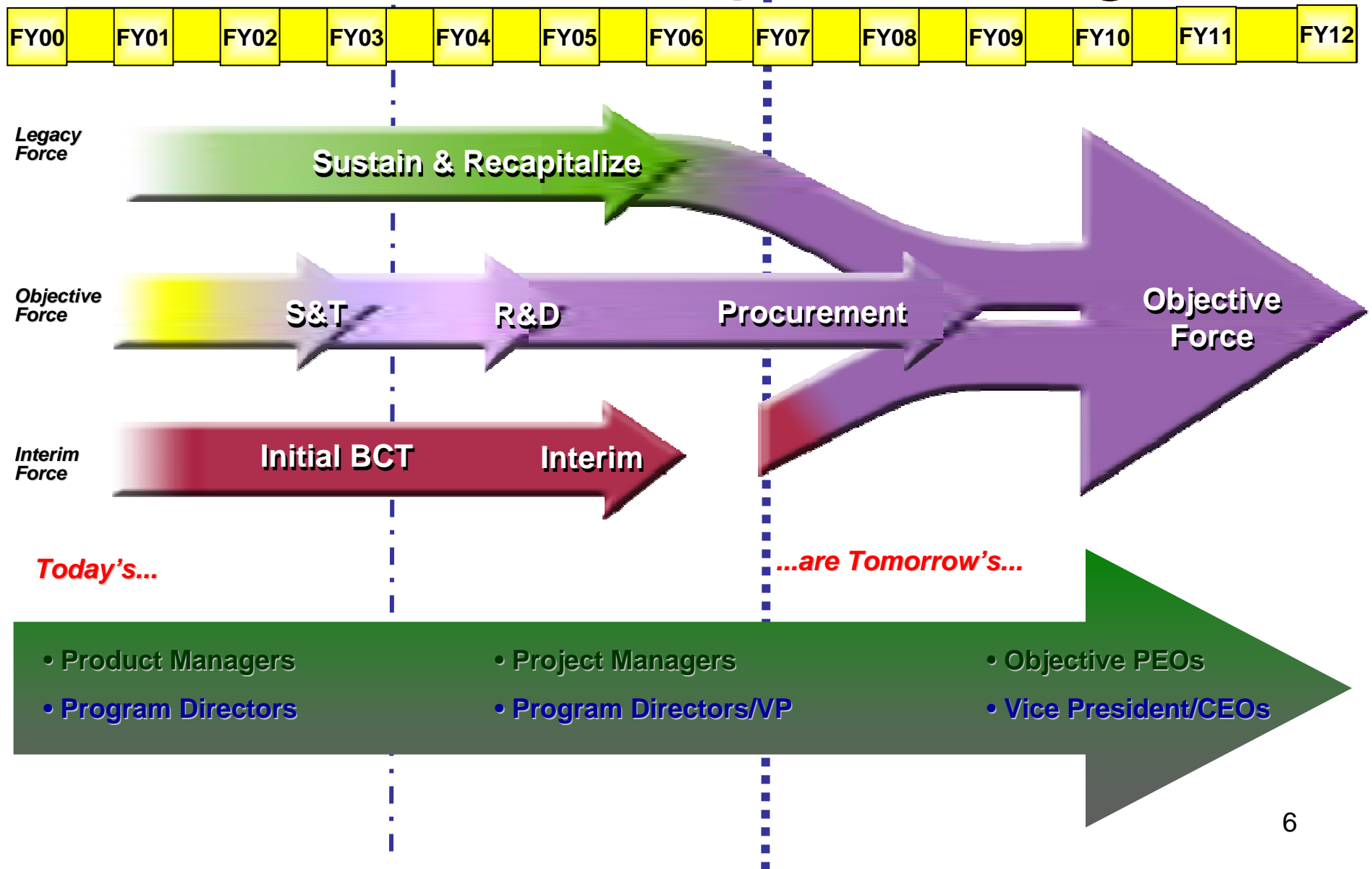


**Urban**



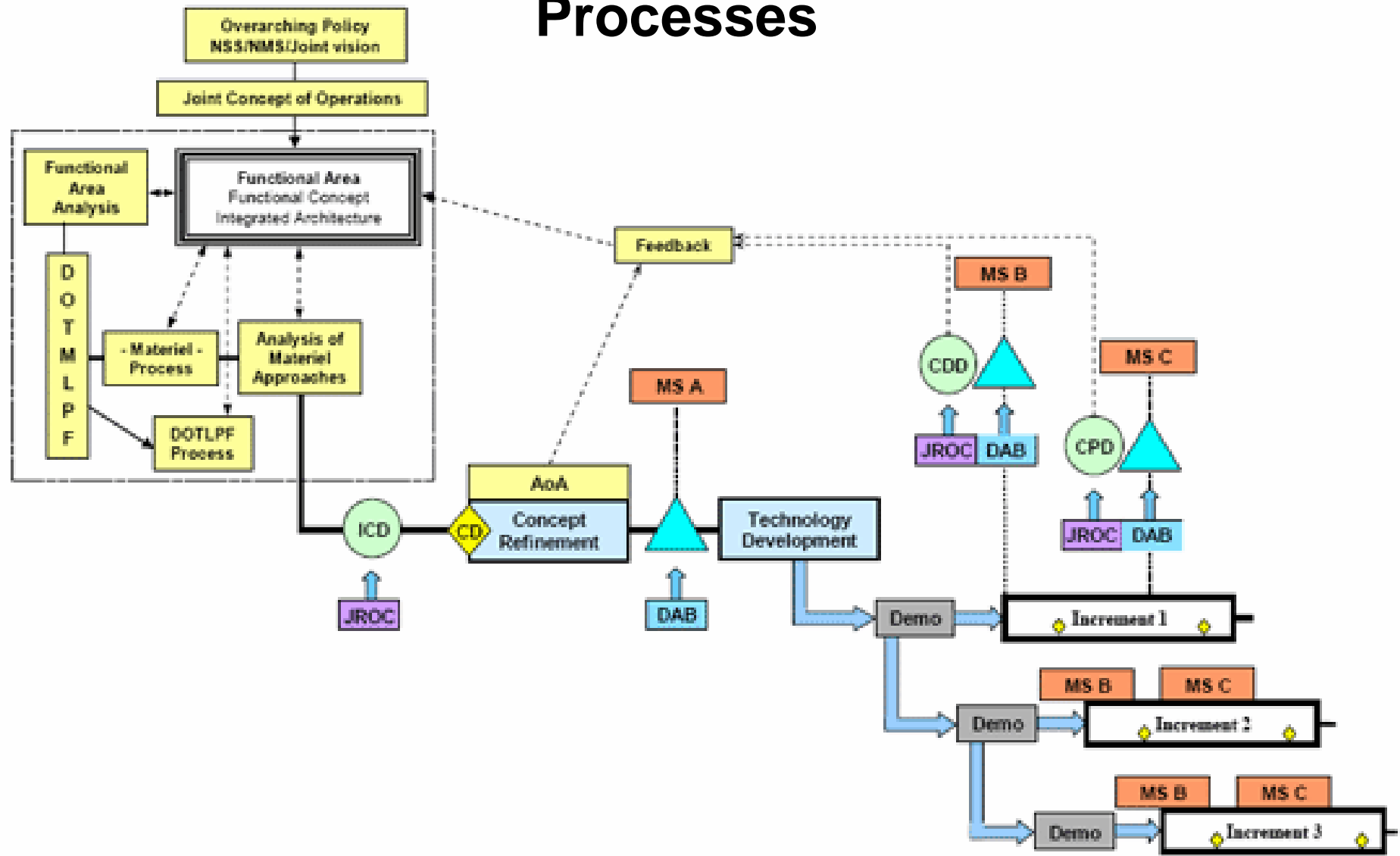


# Our Leadership Challenge



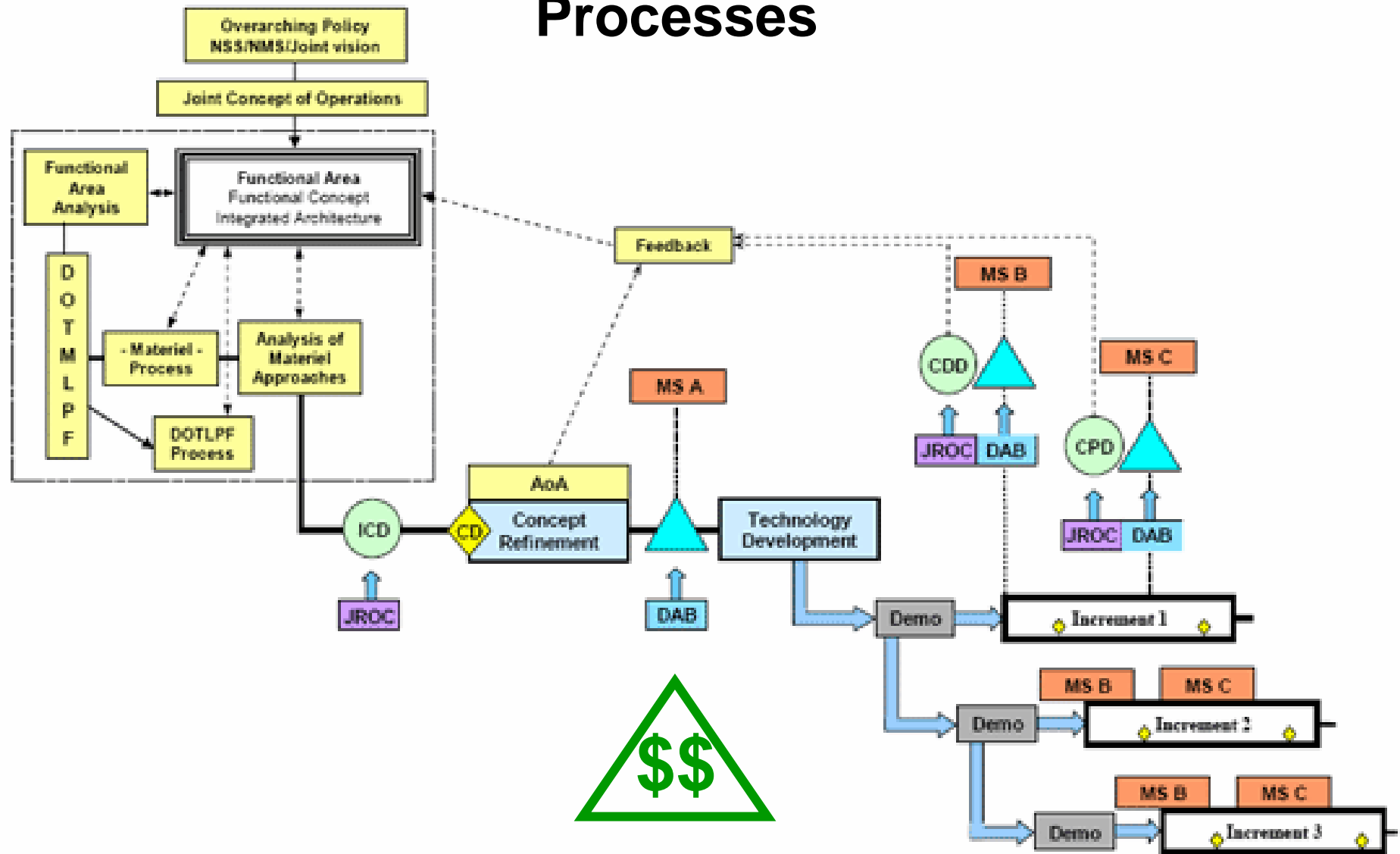


# Evolutionary Requirements and Acquisition Processes





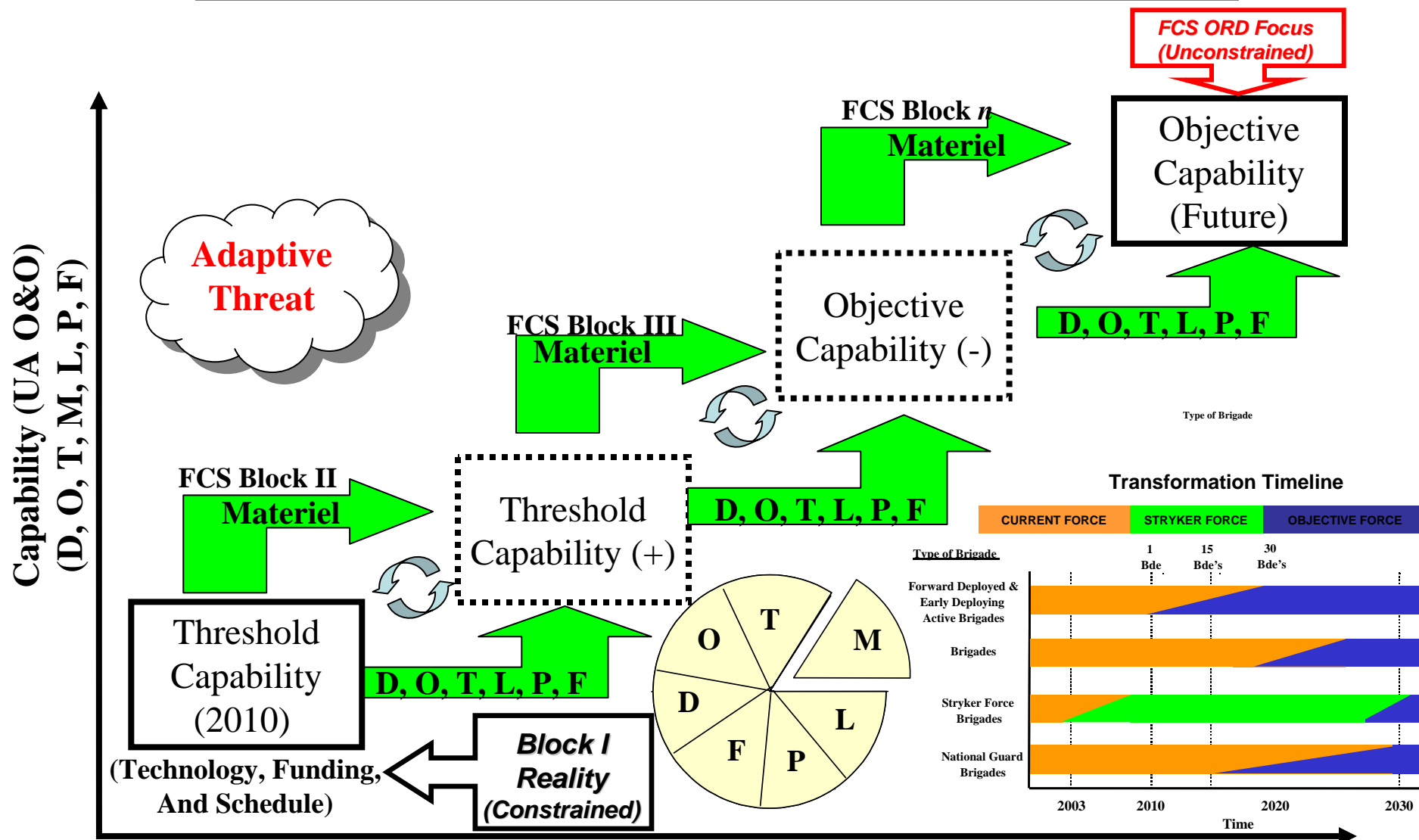
# Evolutionary Requirements and Acquisition Processes





# Unit of Action and Evolutionary Acquisition

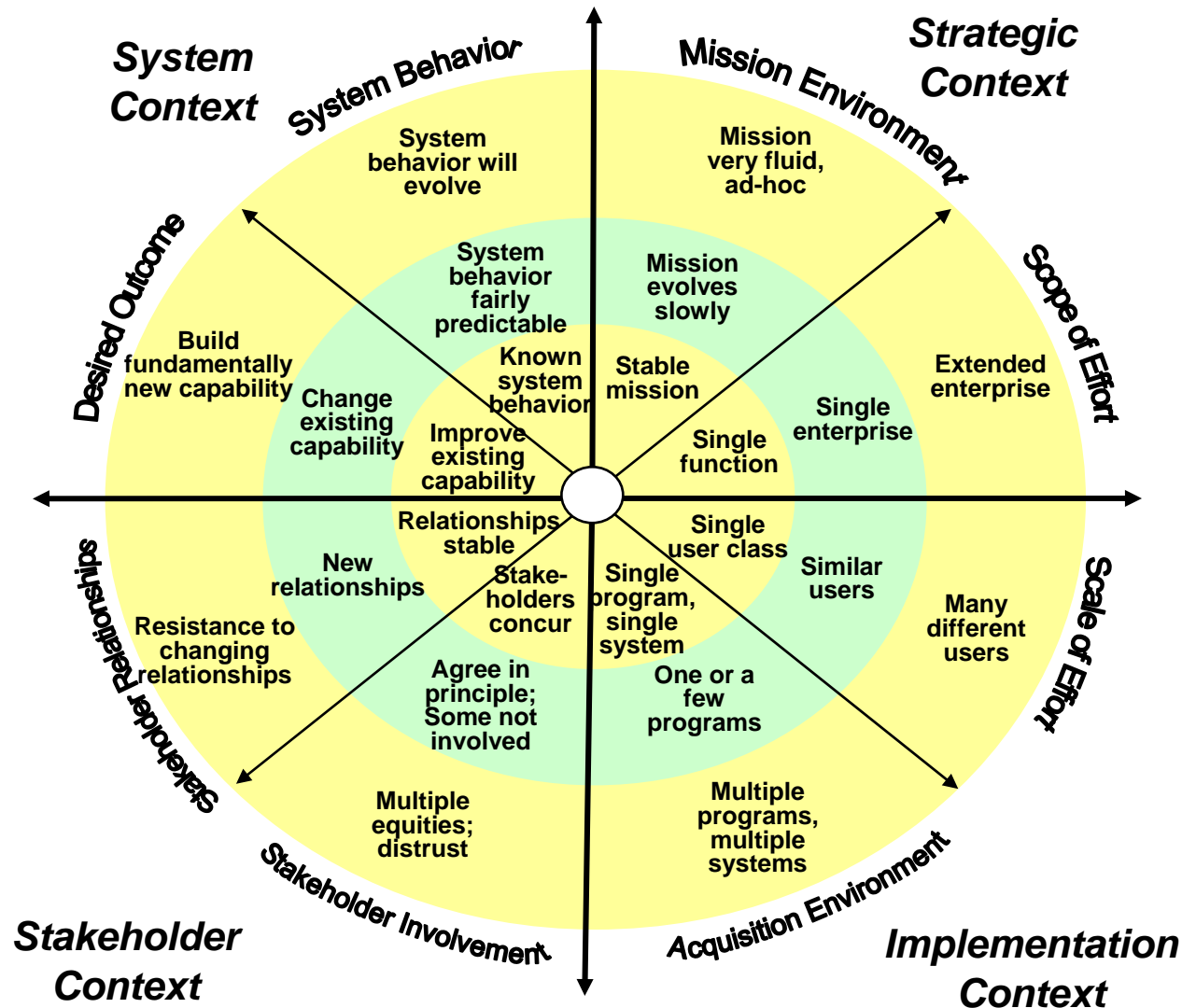
USD(ATL) Memo, 12 Apr 02, Evolutionary Acquisition and Spiral Development



Field FCS-Equipped Units of Action With Threshold Objective Force Capability by the End of the Decade



# Emerging Framework



WORK IN PROGRESS



## Things to Take Away...

- Areas of operation are **HUGE**
- Rock-Paper-Scissors
- Train Like You Fight
- Complement ROE with Materiel Solutions
- Agility, not Flexibility
- Lethargic Process; Long Horizons
- Push the COP Both Ways
- PM Must Help You Fit in ARFORGEN
- Kudo to Col Micucci

Don't Forget to Vote



# Generating Combat Power Across the Continuum of Operations

**Donald F. Schenk**  
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**(888) 683-4222**





# **JSLIST Chemical/Biological Coverall for Combat Vehicle Crewman (JC3)**

**24 October 2006**





## JC3 Background

- **JC3 is a developmental Chemical/Biological Coverall for Combat Vehicle Crewman**
  - JC3 was initiated in January 2005 as an alternate material solution to the solution (JSLIST Type VII and JPACE)
  - The JC3 is constructed out of Selectively Permeable Membrane (SPM) technology





# JC3 Design

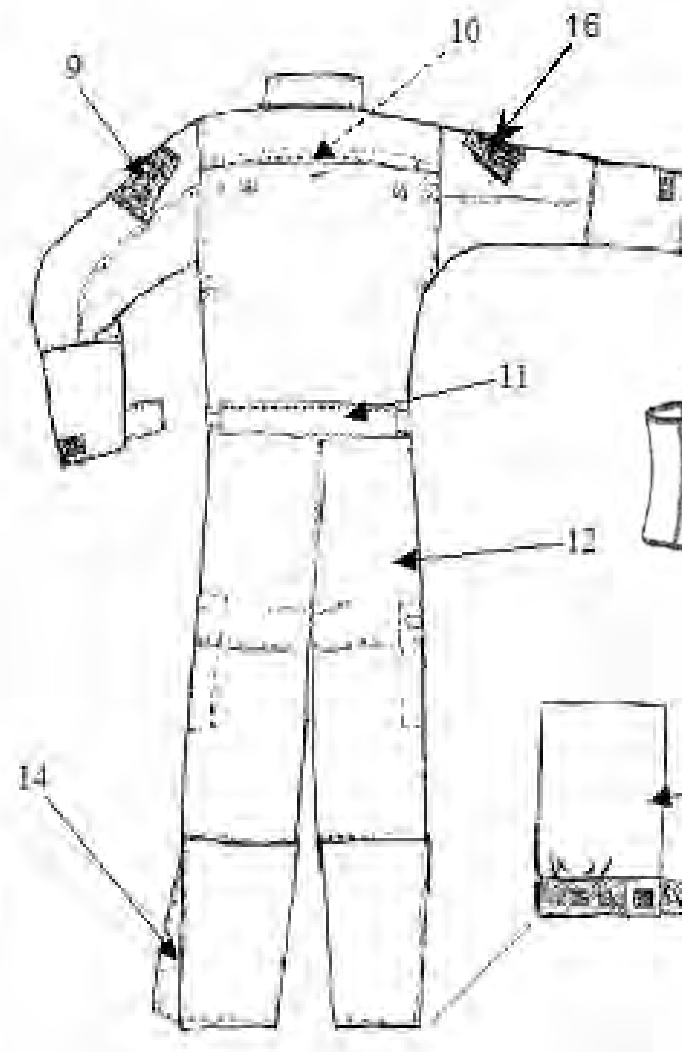
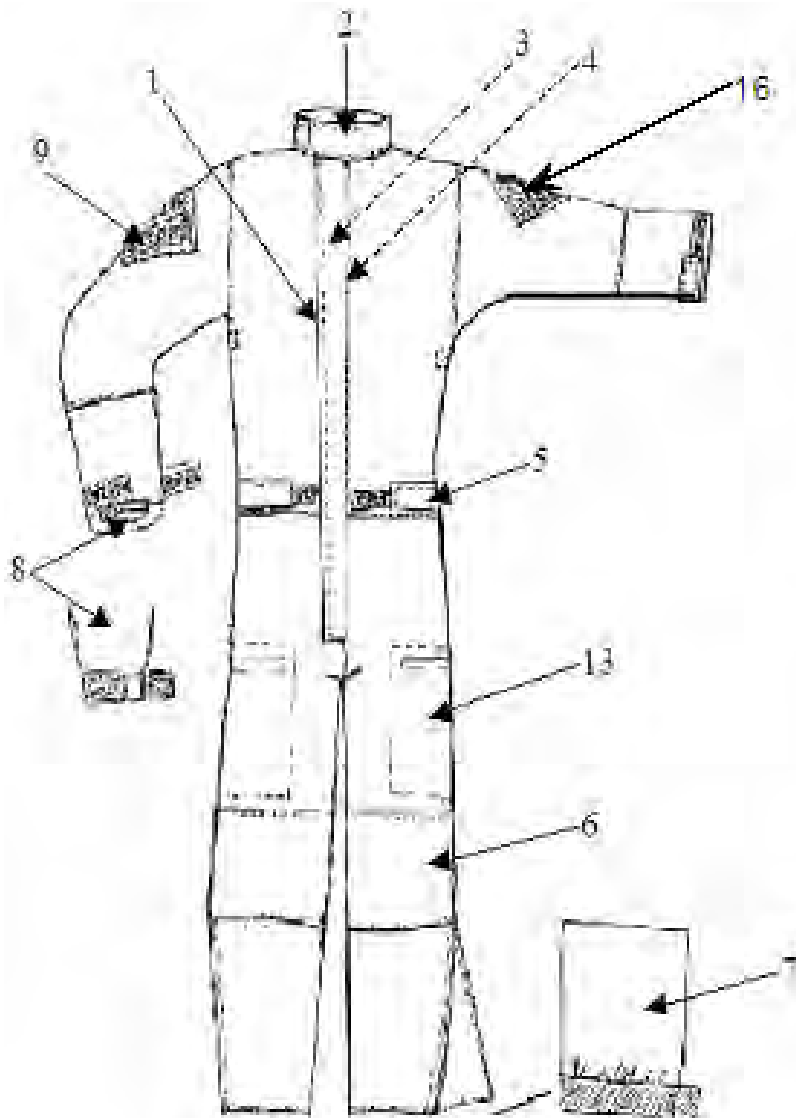
- The JC3 design is based on the current CVC coverall
- Consistent sizing between CVC coverall & CB garment
- Government owned design







# JC3 Design (Cont')

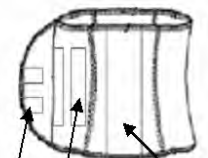


## Neck Dam

FRONT



BACK



Hook Loop Care Label





# Key JC3 Performance Properties

- **Provides Chemical Protection for up to 30 days of wear**
  - 480 hours
  - 4 laundering
- **POL Protection (JP-8, Hydraulic Fluid, etc.)**
  - JC3 provides approximately 99% improvement in chemical protection over current carbon based systems when exposed to POLs
- **Flame Resistance**
  - Protection against 2<sup>nd</sup> and 3<sup>rd</sup> degree burns
  - No melt or adhesion to skin
  - Resists ignition and if ignited self-extinguish





## JC3 Performance Properties (Cont')

- **Weight**
  - Material weight is approximately 37% lighter than JSLIST
  - Packaged weight is approximately 18% lighter than JSLIST
- **Package Volume**
  - JC3 & JSLIST are similar





# JC3 Performance Properties (Cont')

- **Thermal Burden**

- JC3 & JSLIST performed similar
- JPACE performed slightly better
- Pursue reduction of thermal stress for next generation CB armor suit (micro-climate cooling, material technology advancement, etc.)

- **Human Factors**

- JC3 garments were found to be acceptable by CVC Personnel for conducting their missions.
- Integrated with all legacy and co-developmental CB protective equipment





# Additional JC3 Performance Testing

- **Live agent swatch testing**
- **Simulant MIST & Aerosol testing**
- **Operational Test at Camp Lejeune**
- **Field Durability Testing at Fort Knox**
- **Contaminated Doffing testing**
- **Fit & Size testing**





## JC3 Production

- **The JC3 fielding decision is planned for 2Q FY07**
  - **JC3, JPACE or JSLIST Type VII will be recommended for fielding to the USA and USMC armor communities**
  - **Initial fielding of the JC3 would be in FY08**





## **JC3 POC Information**

**JSLIST Program Manager, JPM-IP:**

**Deborah Singleton**

**[deborah.singleton@usmc.mil](mailto:deborah.singleton@usmc.mil)**

**JC3 Program Lead, JPM-IP:**

**Nicholas Hanak**

**[hanakns@jpmoip.org](mailto:hanakns@jpmoip.org)**





# QUESTIONS?





# Acronym List

- **AFS: Alternative Footwear Solutions**
- **BVO: Black Vinyl Overboot**
- **CVC: Combat Vehicle Crewman**
- **GVO: Green Vinyl Overboot**
- **JPACE: Joint Protective Air Crew Ensemble**
- **JSGPM: Joint Service General Purpose Mask**
- **JSLIST: Joint Service Lightweight Integrated Suit Technology**
- **JB2GU: JSLIST Block 2 Glove Upgrade**
- **JC3: JSLIST Chemical/Biological Coverall for Combat Vehicle Crewman (JC3)**
- **MIST: Man In Simulant Test**
- **POL: Petroleum, Oils & Lubricants**
- **SPM: Selective Permeable Membrane**



# STRYKER



## Brigade Combat Teams



**Our Army at War -- Relevant and Ready**



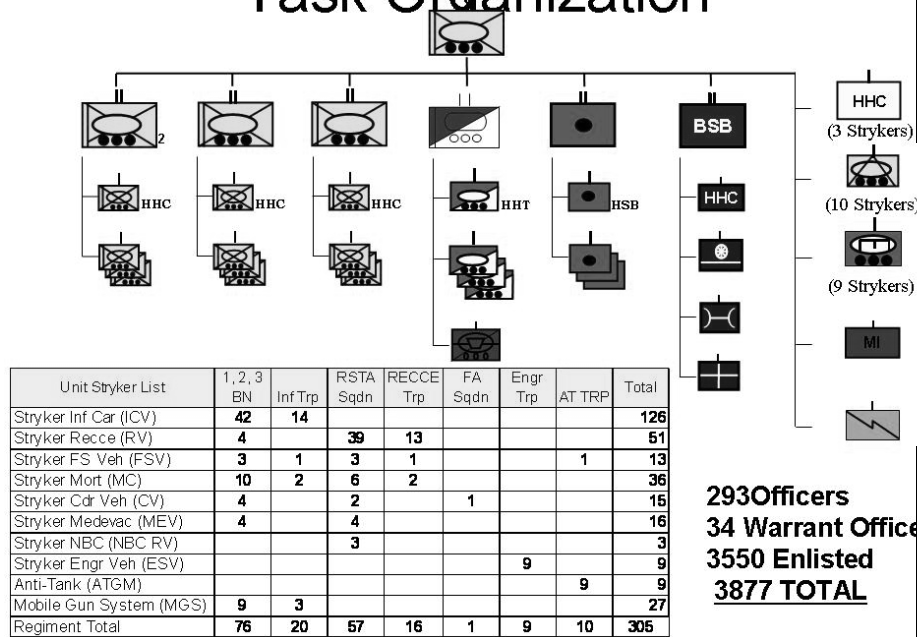
# Background

- LTC John Steele
- Armor Officer – Tank Platoon Leader Desert Shield/Storm (3 AD), Company Command 2 ID Korea
- TF Falcon (Camp Bondsteel), Kosovo, 1 AD Staff Officer
- 1AD - 2-37 AR Executive Officer – May to Oct 03 Baghdad
- 3d SQDN 2d ACR Operations Officer - Oct 03 to Jul 04 – Baghdad, Al Kut, Najaf, Diwaniya, Al Kufa, Afak, Al-Hillah
- 2d ACR and 2d CR Executive Officer Jul 04 to Jun 06 – Fort Polk to Fort Lewis – Unit Generation for SBCT #4



# The SBCT

## Task Organization



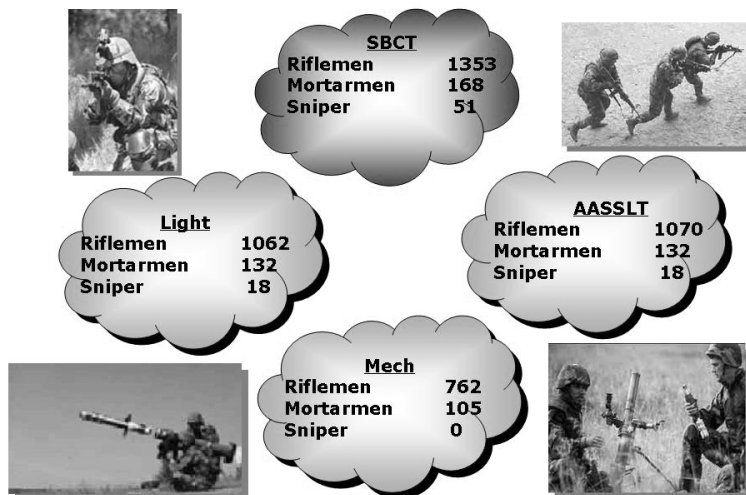
## The Army Vision

**“A force that is deployable, agile, versatile, lethal, survivable, sustainable, and dominant at every point along the spectrum of operations...”**

- **Operational/Deployable Force**
- **Medium Weight Force**
  - The best characteristics of both light and heavy forces
- **Early Entry Force**
- **Bridge to the Future Force**

- Core operational capabilities
  - Strat, operational and tactical mobility
  - Enhanced sit understanding
  - Full spectrum capability
  - Combined arms integration down to company level
  - Decisive action through use of Infantry (close cbt; urban and complex terrain)
  - Reach back capability
- Fully integrated within joint cont force
  - Deploys rapidly; executes early entry
  - Conducts effective combat operations with fully-integrated fires
  - **ABCS – GCCS integration**
  - Prevents, contains, stabilizes, or resolves conflict

## Trigger Pullers





# Stryker Family of Vehicles

FIGHTING VEHICLE? NO  
CAPABILITIES PLATFORM? YES

PROTECTED MOBILITY  
ARMOR PROTECTION FOR  
HMG  
CARRIES 9-MAN SQUAD  
TO 60 MPH; 330 MILES RANGE  
FIREPOWER  
KONGSBERG REMOTE  
WEAPONS  
SYSTEM (RWS) - M2 .50 CAL  
OR MK-19  
SITUATIONAL AWARENESS/COP  
UTILIZES C4ISR SYSTEMS  
RECONNAISSANCE/RESUPPLY/  
CASEVAC

## DEPLOYABILITY:

C-130 – 1 STRYKER  
C-17 – 2 STRYKER (UNIMPR)  
3 STRYKER (IMPR)  
C-5 – 4 STRYKER



Infantry Carrier Vehicle  
(ICV) - 126



Commander's Vehicle  
(CV) - 15



Fire Support Vehicle (FSV) - 13



Recon Vehicle  
(RV) - 51



Medical Evacuation Vehicle  
(MEV) - 16



Engineer Squad Vehicle  
(ESV) - 9

## Commonality

Common Operating Picture

Common Chassis & Drive Train

Common Key Perf Parameters

Common Survivability

TMDE, Spare Parts, Tools &  
Skills

## Key Characteristics

| Configuration | Combat (in.)  | Shipping (in.) |
|---------------|---|----------------|
| Height:       | 122.88  | 103.62         |
| Width:        | 116.43  | 112.80         |
| Length:       | 286.30  | 286.50         |
| Weight:       | 38,000 lbs (target)                                     |                |
| Engine:       | 350 hp JP-8/Diesel (Caterpillar)<br>(vs. LAV III 275hp) |                |
| Transmission: | Allison   |                |
| Brakes:       | 5 inch ABS (Common with FMTV 5-Ton)                     |                |
| Other:        | 8 Wheel Drive, 4 Wheel Steering                         |                |
| Crew:         | 2 + 9-man Squad   |                |



Mobile Gun System  
(MGS) - 27



NBC Recon Veh  
(NBCRV) - 3



120mm Mounted  
Mortar Carrier (MC-B) - 3



Anti Tank Guided Missile  
(ATGM) - 9

## Mobile Gun System

| Key Characteristics: (MGS Variant) |                                  |                 |
|------------------------------------|----------------------------------|-----------------|
| Configuration:                     | Combat (inches)                  | Flying (inches) |
| Height:                            | 130.44                           | 105.67          |
| Width:                             | 116.34                           | 104.47          |
| Length:                            | 300.53                           | 300.53          |
| Weight:                            | 46,995 lbs                       | 40,482 lbs      |
| Engine:                            | 350 hp JP-8/Diesel (Caterpillar) |                 |
| Transmission:                      | Allison                          |                 |
| Brakes:                            | 5 inch ABS                       |                 |
| Other:                             | 8 Wheel Drive; 4 Wheel Steering  |                 |
| Crew:                              | 3                                |                 |



Manufacturer:  
**GENERAL DYNAMICS**  
Land Systems

| C2                       | Mobility  | Armament  | Survivability   |
|--------------------------|---|---|---|
| FBCB2<br>SINCGARS<br>GPS | Top Speed – 60 mph<br>50m Dash – 9 sec.<br>Wheel Clearance – 21 in<br>Vertical Climb – 23 in<br>Gap Crossing – 78 in<br>Range – 300 miles (Cbt Ops) | M68A1E8 105mm Main Gun<br>with 18-Round Autoloader<br>M2 .50 cal Cdr's Weapon<br>M240C 7.62mm Coax MG | High Hard Steel Structure<br>Protection: 14.5mm<br>RPG w/ Add on SLAT Armor<br>Titanium Armor for Critical<br>Gun-pod Areas<br>Spall Liner<br>Smoke Grenade Launchers |

**Mounted Battle Command On The Move (MBCOTM)**

Pre Production 1 (PP1) Build

LTC Mike Ryan  
PdM MBCOTM  
5 Apr 06

MBCOTM... Extending the Reach of Battle Command

**Stryker Vehicles are 312 pieces of equipment out of over 55K in an SBCT.....**

*"I have watched this vehicle save my soldiers lives and enable them to kill our nation's enemies. In urban combat there is no better vehicle for delivering a squad of infantrymen to close with and destroy the enemy. It is fast, quiet, incredibly survivable, reliable, lethal, and capable of providing amazing situational awareness."*

*These qualities distinguish it from every other platform in the Army inventory but most importantly it delivers the most valuable weapon on the battlefield – a soldier.*

**LTC Erik Kurilla**  
**CDR, 1-24 Infantry**

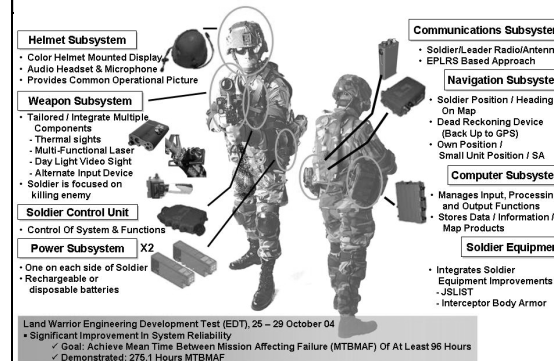
## ICV-FSEP Spiral 1 Systems

- Non-Lethal Effects**
  - Medium Range Acoustic Device
  - High Power White Light
  - Laser Dazzler
- Lethal Effects Enhancement**
  - Gunfire Detectors
    - Acoustic/EO/IR
  - Integrated, rapid slew-to-cue, man-in-the-loop engagement
- Platform Protection**
  - C-IED Jammer
  - Slat Armor



*Multi-spectral Target Sensing Capabilities: IR, Acoustic, Optical*

## Land Warrior System





# OPERATION AFAK

TASK ORGANIZATION: (EFF 010700JUN04)

## AFAK

### B/2-37AR(SE)

1/B/2-37 AR  
4/KILLER  
5/KILLER  
THT  
TPT

### M/3/2ACR(ME)

1/MAD DOG  
4/IRON  
3/B/2-37 AR  
THT

### SQDN CTRL

3/MADDOG – PSD  
6/KILLER - RES  
FLE  
FAS

**MISSION:** 012300JUN04, 3/2 conducts zone reconnaissance of AFAK vic. MA233476 and destroys militia forces to determine militia activity and demonstrate US Forces' resolve.

**Purpose** is to facilitate future successful Iraqi Security Forces' operations in Qaddisiya Province.

### Key Tasks.

- Rehearsal: Maneuver, communications, and medical evacuation
- Control and communications
- Determine enemy presence in AFAK
- Destroy enemy forces

**Endstate.** MM destroyed in AFAK, reduced Mukhtada Militia influence, minimum civilian casualties, positive attitude shared among local residents, 3d Squadron positioned to conduct sustained combat operations in Diwaniya or Qaddisiya.

## TASKS

### B CO

T: FOZR in AFAK East  
P: Destroy MM in AFAK  
T: O/O execute TCPs vic CP7 and 15

### MCO

T: FOZR in AFAK West  
P: Destroy MM in AFAK  
T: O/O execute TCPs vic CP 5

### HHT

T: Provide FLE / FAS / RTNs set vic CP1

## TIMELINE

010830JUN – OPORD  
011400JUN – SQDN BACK BRIEF  
011500JUN – REHEARSAL  
012200JUN – B Co SP  
012205JUN – M Co SP  
012210JUN – TAC SP  
012215JUN – HHT SP  
012300JUN – SWT on station - 020300JUN  
012255JUN – SQN CP 1, O/O M Co move CP 6, B Co move CP 7  
020400JUN – Attack complete, set TCPs  
020700JUN – Consolidate and Reorganize  
010730JUN – Set joint TCPs  
020930JUN – B Co SP to Diwaniyah  
020945JUN – HHT SP to Diwaniyah  
021000JUN – M Co SP to Diwaniyah  
021030JUN – Sqdn begins arriving Cp Wolfpack

## COORDINATING INSTRUCTIONS

1. Units gauge response of population to US presence.
2. Units identify and report Sadr posters / anti coalition graphity for removal morning of 2 JUN by IPs
3. MEDEVAC 33.55 – DUSTOFF
4. Current ROE in effect
5. FAS / FLE / Retrans initila location vic CP1
6. TCBs responsible to evac casualties to AXP.
7. Mass casualty = 3+ wounded, AXP moves to location.
8. Maintain 360 degree security at all times.
9. SQDN retrans cmd net on FH700 past CP1

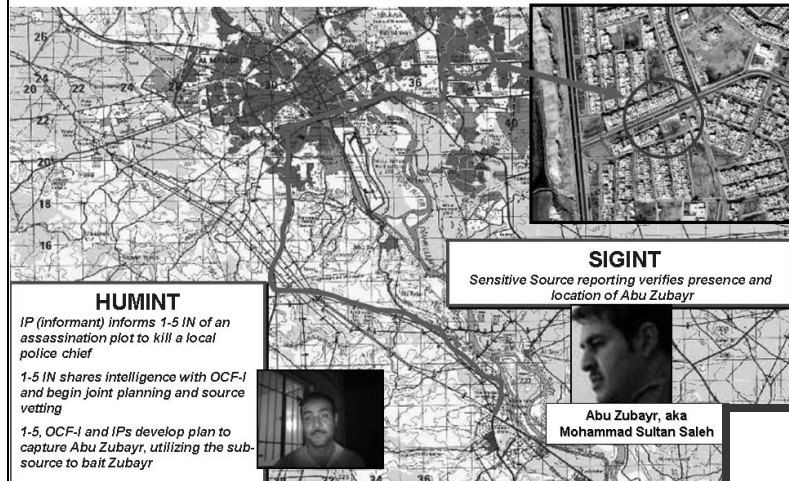
## PIRs

1. Enemy contact.
2. Location of Sadr posters /anti coalition Graphity.
3. Enemy defensive positions / roadblocks
4. IPs in zone

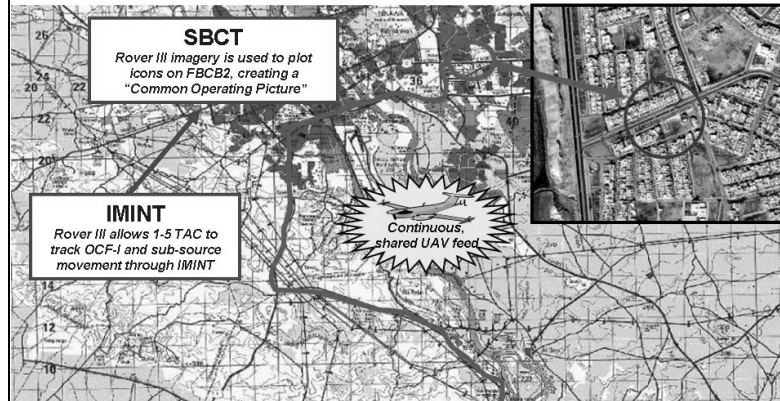


# A Quality of Firsts

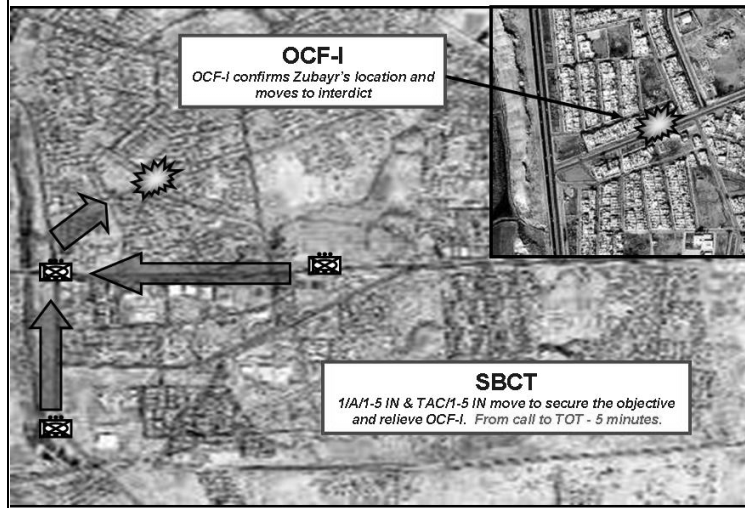
## SEE FIRST



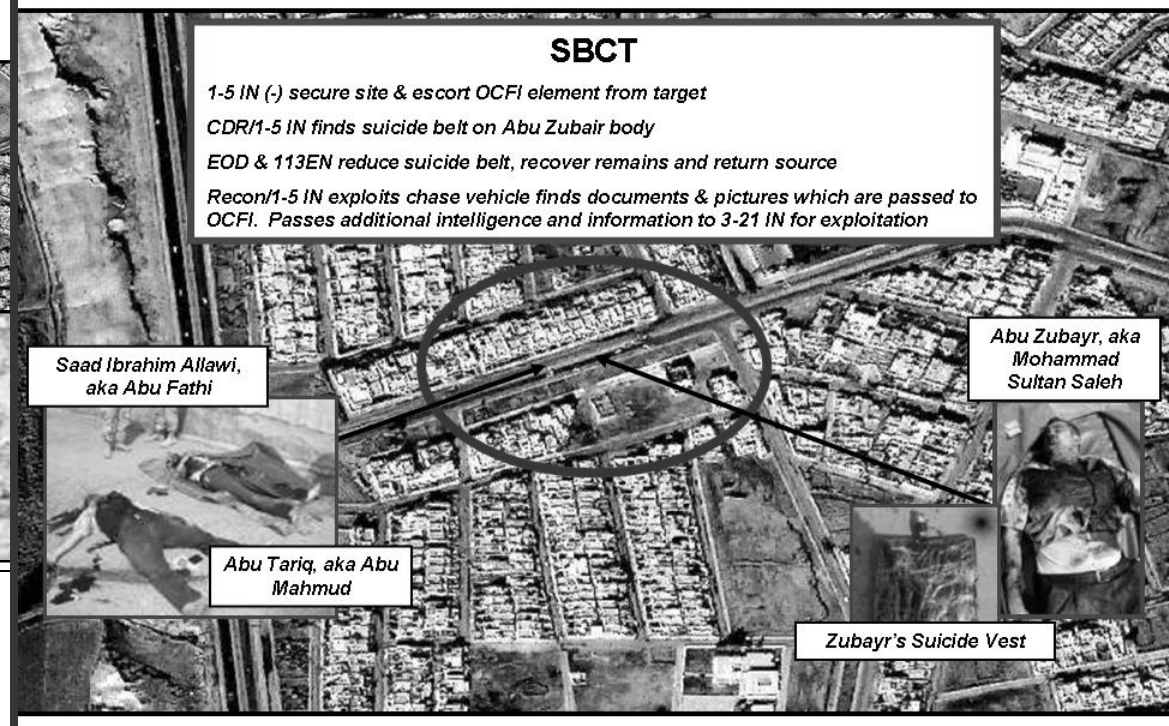
## UNDERSTAND FIRST



## ACT FIRST



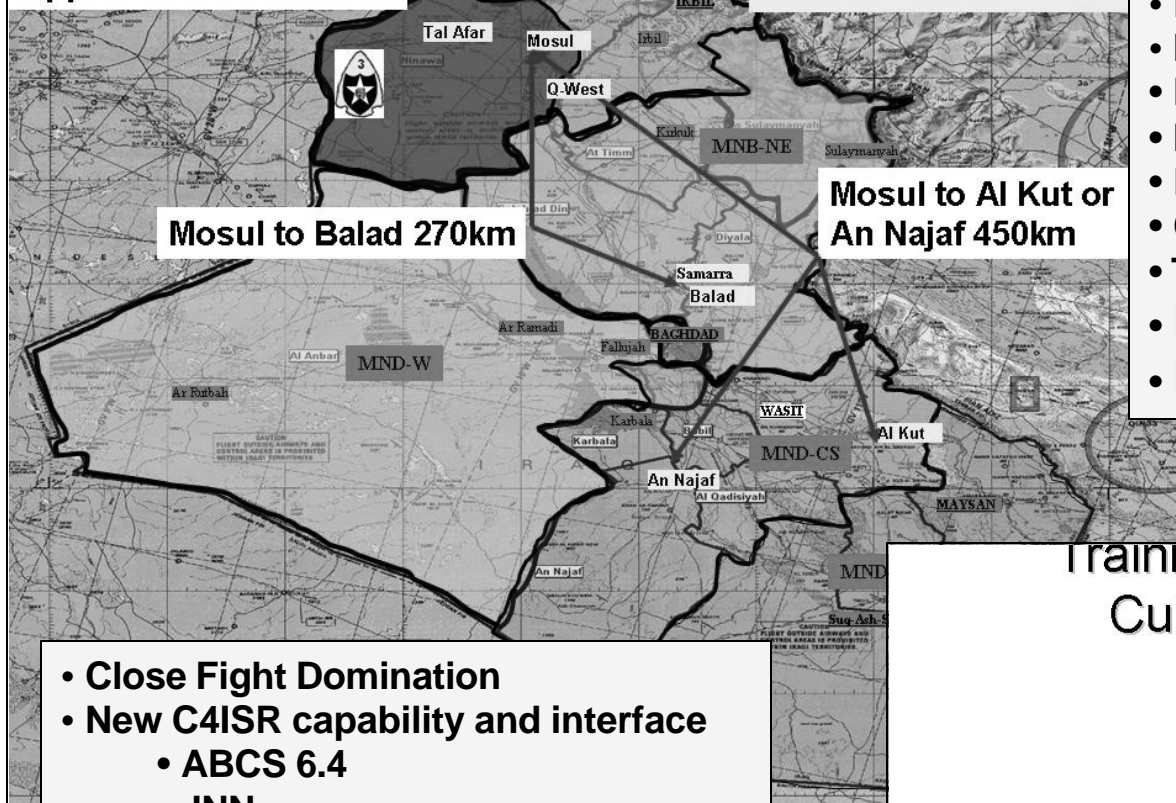
## FINISH DECISIVELY





**AO Arrowhead**  
Approx. 220km x 264km

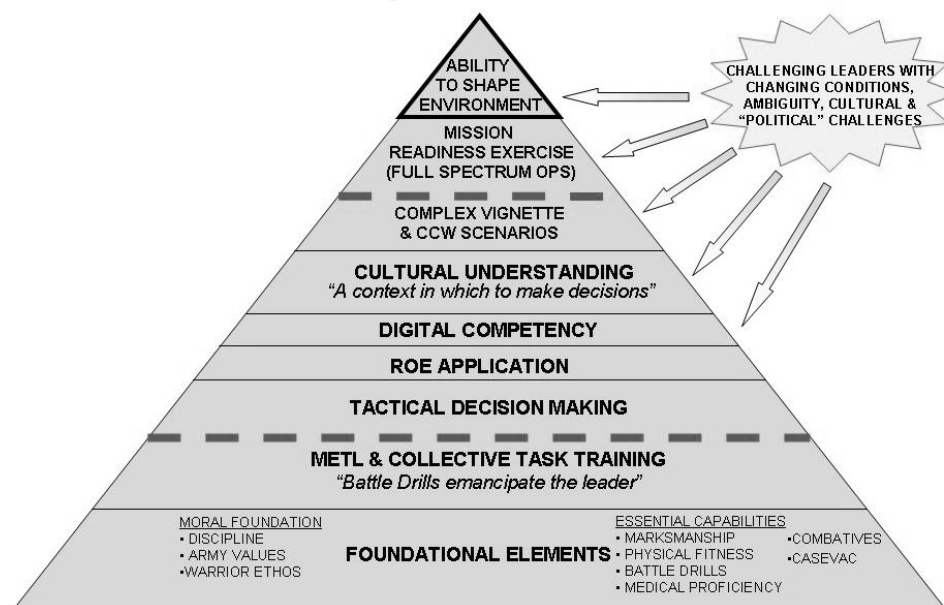
**AO Defined in SBCT O&O:**  
50km X 50 km



- Full Spectrum Dominance
- ISF Partnerships
- Non-Kinetic vs Kinetic
- IO/CMO focus
- Policeman mentality
- Company Level Fight
- The Leadership Reaction Course
- **Need Next Generation C4ISR**
- **Need Training Systems**

- Close Fight Domination
- New C4ISR capability and interface
  - ABCS 6.4
  - JNN
- New Org/Equipment
  - Combined Arms
  - MGS
- Infantry/Info Centric
  - Mortars/Snipers
  - Vehicles and Wpns Sqds
  - ABCS/C4ISR
- Logistics/Support Concepts
- Leader Training Mindset

## Training Letnal, Adaptive, and Culturally Aware Leaders





# **Robotic Systems Joint Project Office**



**Leveraging Technology Today –  
Building Capability for Tomorrow**

**Presented to**

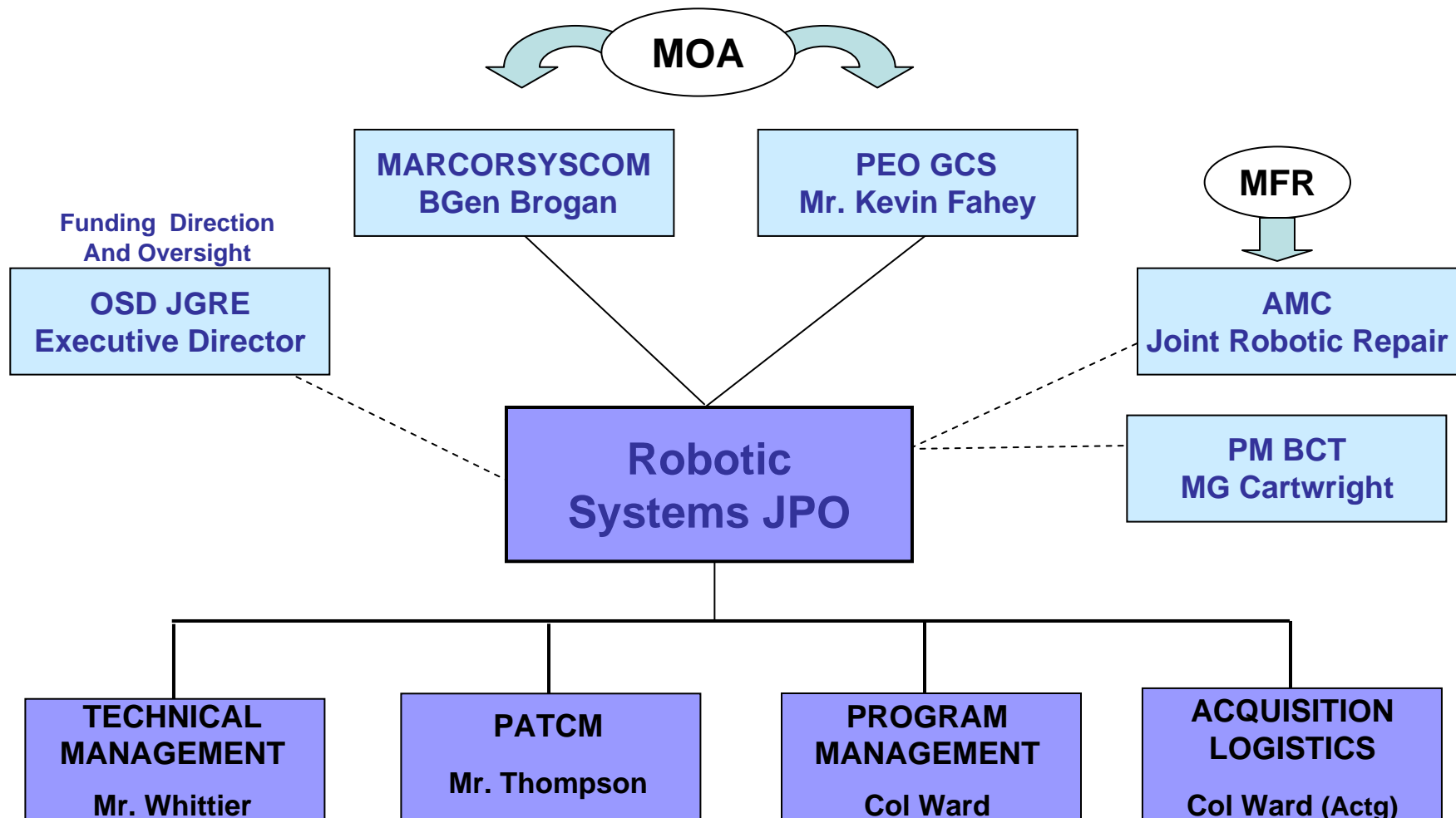
**Combat Vehicle Conference**

**24 October 2006**





# Organization







# Capabilities in the Field

## *The Future is Today*



### EOD Defeat Systems



### Counter Mine Systems



### Surveillance and Inspection Systems





# Capability Being Developed

## *Current to Future*



Gladiator

**Remote Combat Tasks**



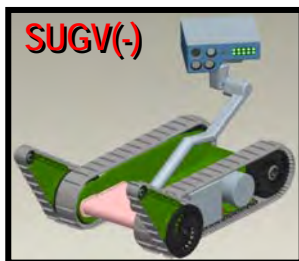
Assault  
Breacher Vehicle

**Combat Obstacle Clearing**



SWORDS

**Weaponized Small Robot**



SUGV(-)

**Small Robotic Scout System**





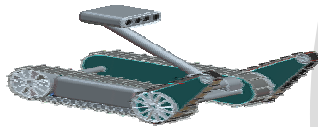
# FCS Robotic Systems The Future



**Armed Robotic Vehicles-Assault-Light  
(ARV-A-L)**



**Multifunctional Utility/Logistics and Equipment  
MULE-Transport**

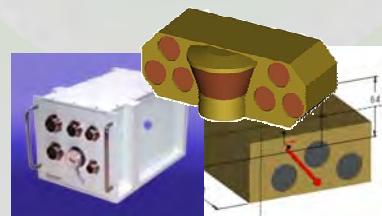


**Small Unmanned Ground Vehicle  
(SUGV)**



**Countermine-Mule**

**Armed Robotic Vehicles  
ARV-RSTA**



**Autonomous Navigation System  
ANS**

**Armed Robotic Vehicles  
ARV-Assault**



*Acquisition Excellence*





LTC Lanier Ward

Regimental S3

May 02 - June 03

(OIF: April 03 - June 03)

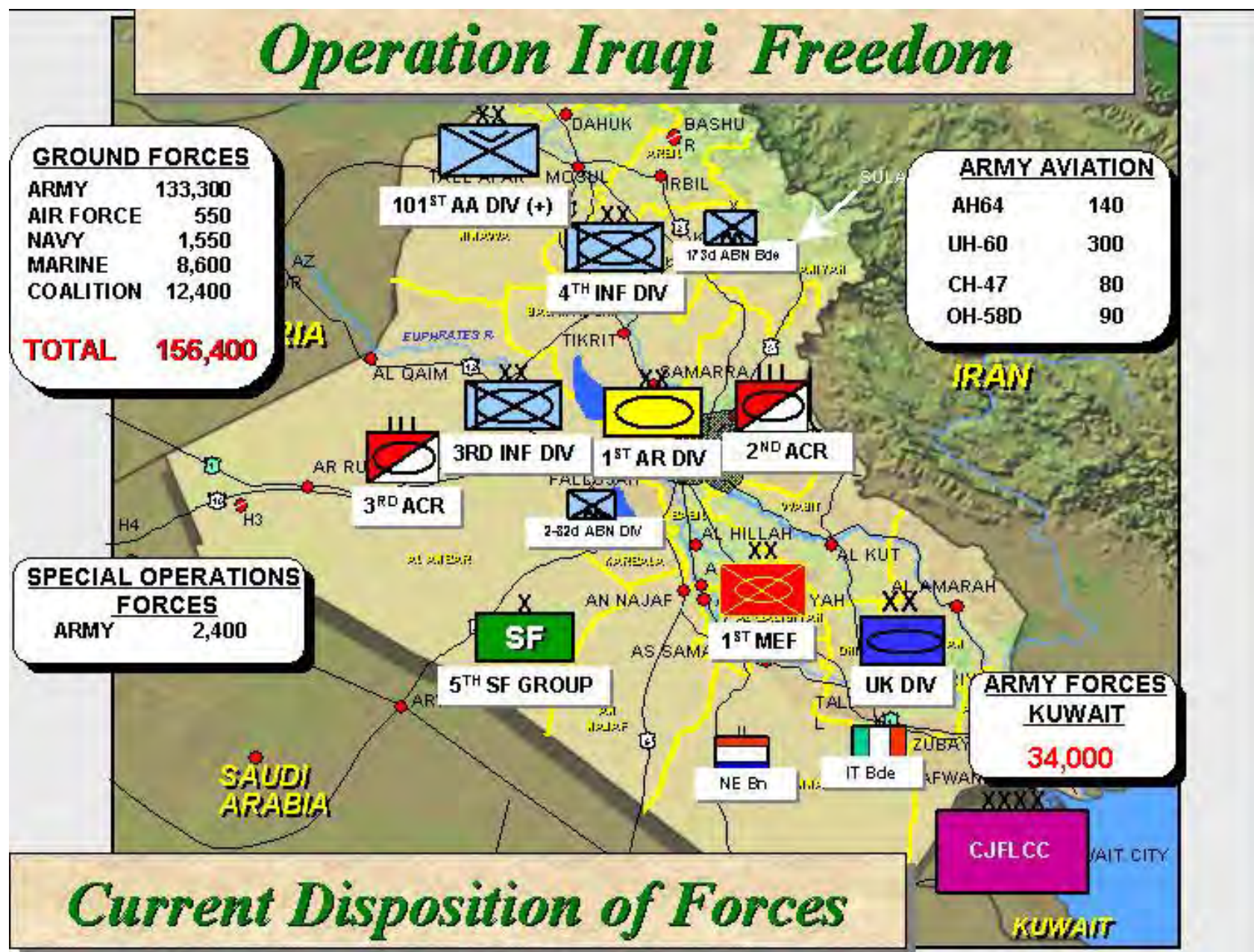


# Light Cavalry Organization (Was Augmented With MECH/AR Forces)





# June 2003





# FM 3-34 (DRAFT)

## Counterinsurgency

- COIN is a combination of offensive, defensive and stability operations.
- Paradoxes of Counterinsurgency:
  - The more you protect your force, the less secure you are (I hope they change protect to isolate).
- Successful Practices:
  - Emphasize intelligence.
  - Focus on the population, their needs and security.



# Must Be Able To Engage With The Population





While Protecting  
The Best Sensor For COIN...  
The Soldier

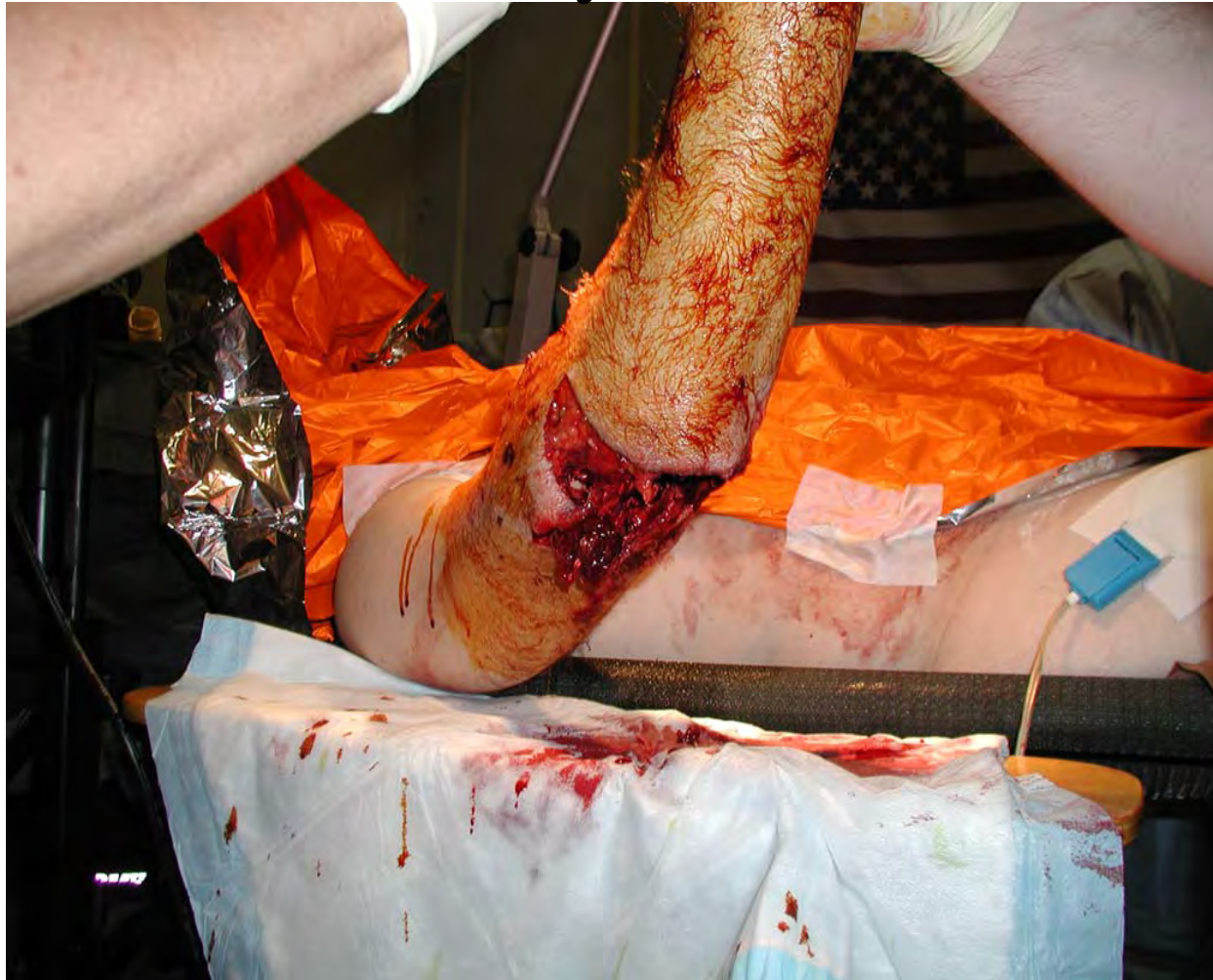








Must Get This Right  
But Understand  
There Will Always Be Casualties..





# STRYKER



## Brigade Combat Teams

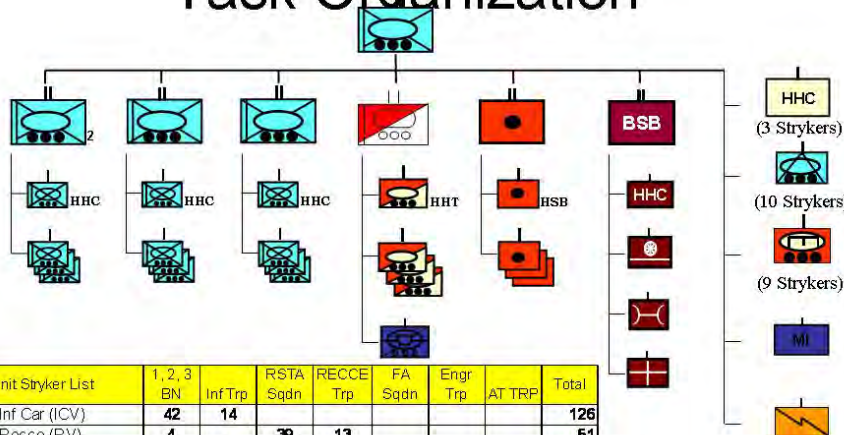


**Our Army at War -- Relevant and Ready**



# The Army Vision

## Task Organization



| Unit Stryker List       | 1, 2, 3<br>BN | Inf Trp | RSTA<br>Sgdn | RECCE<br>Trp | FA<br>Sgdn | Engr<br>Trp | AT TRP | Total |
|-------------------------|---------------|---------|--------------|--------------|------------|-------------|--------|-------|
| Stryker Inf Car (ICV)   | 42            | 14      |              |              |            |             |        | 120   |
| Stryker Recce (RV)      | 4             |         | 39           | 13           |            |             |        | 56    |
| Stryker FS Veh (FSV)    | 3             | 1       | 3            | 1            |            |             | 1      | 13    |
| Stryker Mort (MC)       | 10            | 2       | 6            | 2            |            |             |        | 36    |
| Stryker Cdr Veh (CV)    | 4             |         | 2            |              | 1          |             |        | 15    |
| Stryker Medevac (MEV)   | 4             |         | 4            |              |            |             |        | 16    |
| Stryker NBC (NBC RV)    |               |         | 3            |              |            |             |        | 3     |
| Stryker Engr Veh (ESV)  |               |         |              |              |            | 9           |        | 9     |
| Anti-Tank (ATGM)        |               |         |              |              |            |             | 9      | 9     |
| Mobile Gun System (MGS) | 9             | 3       |              |              |            |             |        | 27    |
| Regiment Total          | 76            | 20      | 57           | 16           | 1          | 9           | 10     | 305   |

293 Officers  
34 Warrant Officers  
3550 Enlisted  
3877 TOTAL

# The Army Vision

**“A force that is deployable, agile, versatile, lethal, survivable, sustainable, and dominant at every point along the spectrum of operations...”**

- **Operational/Deployable Force**
- **Medium Weight Force**
  - **The best characteristics of both light and heavy forces**
- **Early Entry Force**
- **Bridge to the Future Force**

## Trigger Pullers



- Core operational capabilities
  - Strat, operational and tactical mobility
  - Enhanced sit understanding
  - Full spectrum capability
  - Combined arms integration down to company level
  - Decisive action through use of Infantry (close cbt; urban and complex terrain)
  - Reach back capability
- Fully integrated within joint cont force
  - Deploys rapidly; executes early entry
  - Conducts effective combat operations with fully-integrated fires
  - **ABCS – GCCS integration**
  - Prevents, contains, stabilizes, or resolves conflict



# Stryker Family of Vehicles

FIGHTING VEHICLE? **NO**  
CAPABILITIES PLATFORM? **YES**

## PROTECTED MOBILITY

ARMOR PROTECTION FOR  
HMG  
CARRIES 9-MAN SQUAD  
TO 60 MPH; 330 MILES RANGE

## FIREPOWER

KONGSBERG REMOTE  
WEAPONS  
SYSTEM (RWS) - M2 .50 CAL  
OR MK-19

## SITUATIONAL AWARENESS/COP

UTILIZES C4ISR SYSTEMS  
RECONNAISSANCE/RESUPPLY/  
CASEVAC



Infantry Carrier Vehicle  
(ICV) - 126



Commander's Vehicle  
(CV) - 15



Fire Support Vehicle (FSV) - 13



Recon Vehicle  
(RV) - 51



Medical Evacuation Vehicle  
(MEV) - 16



Engineer Squad Vehicle  
(ESV) - 9

## Commonality

Common Operating Picture

Common Chassis & Drive Train

Common Key Perf Parameters

Common Survivability

TMDE, Spare Parts, Tools &  
Skills

## Key Characteristics

| Configuration | Combat (in.)  | Shipping (in.) |
|---------------|---|----------------|
| Height:       | 122.88  | 103.62         |
| Width:        | 116.43  | 112.80         |
| Length:       | 286.30  | 286.50         |
| Weight:       | 38,000 lbs (target)                                     |                |
| Engine:       | 350 hp JP-8/Diesel (Caterpillar)<br>(vs. LAV III 275hp) |                |
| Transmission: | Allison   |                |
| Brakes:       | 5 inch ABS (Common with FMTV 5-Ton)                     |                |
| Other:        | 8 Wheel Drive, 4 Wheel Steering                         |                |
| Crew:         | 2 + 9-man Squad   |                |



Mobile Gun System  
(MGS) - 27



NBC Recon Veh  
(NBCRV) - 3



120mm Mounted  
Mortar Carrier (MC-B) - 3



Anti Tank Guided Missile  
(ATGM) - 9

## DEPLOYABILITY:

C-130 - 1 STRYKER

C-17 - 2 STRYKER (UNIMPR)  
3 STRYKER (IMPR)

C-5 - 4 STRYKER



## Mobile Gun System

### Key Characteristics: (MGS Variant)

| Configuration: | Combat (inches)                  | Flying (inches) |
|----------------|----------------------------------|-----------------|
| Height:        | 130.44                           | 105.67          |
| Width:         | 116.34                           | 104.47          |
| Length:        | 300.53                           | 300.53          |
| Weight:        | 48,995 lbs                       | 40,482 lbs      |
| Engine:        | 350 hp JP-8/Diesel (Caterpillar) |                 |
| Transmission:  | Allison                          |                 |
| Brakes:        | 5 inch ABS                       |                 |
| Other:         | 8 Wheel Drive; 4 Wheel Steering  |                 |
| Crew:          | 3                                |                 |



Manufacturer:

**GENERAL DYNAMICS**  
Land Systems

### C2

FBCB2  
SINCGARS  
GPS

### Deployability

C-130 - 1 each  
C-17 - 3 each  
C-5 - 4 each

### Mobility

Top Speed - 60 mph  
50m Dash - 9 sec.  
Wheel Clearance - 21 in  
Vertical Climb - 23 in  
Gap Crossing - 78 in  
Range - 300 miles (Cbt Ops)

### Armament

M68A1E8 105mm Main Gun  
with 18-Round Autoloader  
M2 .50 cal Cdr's Weapon  
M240C 7.62mm Coax MG

### Survivability

High Hard Steel Structure  
Protection: 14.5mm  
RPG w/ Add on SLAT Armor  
Titanium Armor for Critical  
Gun-pod Areas  
Spall Liner  
Smoke Grenade Launchers



## Mounted Battle Command On The Move (MBCOTM)

Pre Production 1 (PP1) Build



LTC Mike Ryan  
PdM MBCOTM  
5 Apr 06

MBCOTM... Extending the Reach of Battle Command

## ICV-FSEP Spiral 1 Systems

- Non-Lethal Effects**
  - Medium Range Acoustic Device
  - High Power White Light
  - Laser Dazzler
- Lethal Effects Enhancement**
  - Gunfire Detectors
    - Acoustic/EO/IR
  - Integrated, rapid slew-to-cue, man-in-the-loop engagement
- Platform Protection**
  - C-IED Jammer
  - Slat Armor



**Multi-spectral Target Sensing Capabilities: IR, Acoustic, Optical**

## Land Warrior System



Land Warrior Engineering Development Test (EDT), 25 - 29 October 04

- Significant Improvement in System Reliability
- Goal: Achieve Mean Time Between Mission Affecting Failure (MTBMFAF) Of At Least 96 Hours
- Demonstrated: 275.1 Hours MTBMFAF

*"I have watched this vehicle save my soldiers lives and enable them to kill our nation's enemies. In urban combat there is no better vehicle for delivering a squad of infantrymen to close with and destroy the enemy. It is fast, quiet, incredibly survivable, reliable, lethal, and capable of providing amazing situational awareness.*

*These qualities distinguish it from every other platform in the Army inventory but most importantly it delivers the most valuable weapon on the battlefield - a soldier.*

**LTC Erik Kurilla**  
CDR, 1-24 Infantry

**Stryker Vehicles are 312 pieces of equipment out of over 55K in an SBCT.....**



# OPERATION AFAK

**TASK ORGANIZATION: (EFF 010700JUN04)**

## AFAK

### B/2-37AR(SE)

1/B/2-37 AR  
4/KILLER  
5/KILLER  
THT  
TPT

### M/3/2ACR(ME)

1/MAD DOG  
4/IRON  
3/B/2-37 AR  
THT

### SQDN CTRL

3/MADDOG – PSD  
6/KILLER - RES  
FLE  
FAS

**MISSION:** 012300JUN04, 3/2 conducts zone reconnaissance of AFAK vic. MA233476 and destroys militia forces to determine militia activity and demonstrate US Forces' resolve.

**Purpose** is to facilitate future successful Iraqi Security Forces' operations in Qaddisiya Province.

### Key Tasks.

- Rehearsal: Maneuver, communications, and medical evacuation
- Control and communications
- Determine enemy presence in AFAK
- Destroy enemy forces

**Endstate.** MM destroyed in AFAK, reduced Mukhtada Militia influence, minimum civilian casualties, positive attitude shared among local residents, 3d Squadron positioned to conduct sustained combat operations in Diwaniya or Qaddisiya.

## TASKS

### B CO

T: FOZR in AFAK East  
P: Destroy MM in AFAK  
T: O/O execute TCPs vic CP7 and 15

### MCO

T: FOZR in AFAK West  
P: Destroy MM in AFAK  
T: O/O execute TCPs vic CP 5

### HHT

T: Provide FLE / FAS / RTNs set vic CP1

## TIMELINE

010830JUN – OPORD  
011400JUN – SQDN BACK BRIEF  
011500JUN – REHEARSAL  
012200JUN – B Co SP  
012205JUN – M Co SP  
012210JUN – TAC SP  
012215JUN – HHT SP  
012300JUN – SWT on station - 020300JUN  
012255JUN – SQN CP 1, O/O M Co move CP 6, B Co move CP 7  
020400JUN – Attack complete, set TCPs  
020700JUN – Consolidate and Reorganize  
010730JUN – Set joint TCPs  
020930JUN – B Co SP to Diwaniyah  
020945JUN – HHT SP to Diwaniyah  
021000JUN – M Co SP to Diwaniyah  
021030JUN – Sqdn begins arriving Cp Wolfpack

## COORDINATING INSTRUCTIONS

1. Units gauge response of population to US presence.
2. Units identify and report Sadr posters / anti coalition graphy for removal morning of 2 JUN by IPs
3. MEDEVAC 33.55 – DUSTOFF
4. Current ROE in effect
5. FAS / FLE / Retrans initila location vic CP1
6. TCBs responsible to evac casualties to AXP.
7. Mass casualty = 3+ wounded, AXP moves to location.
8. Maintain 360 degree security at all times.
9. SQDN retrans cmd net on FH700 past CP1

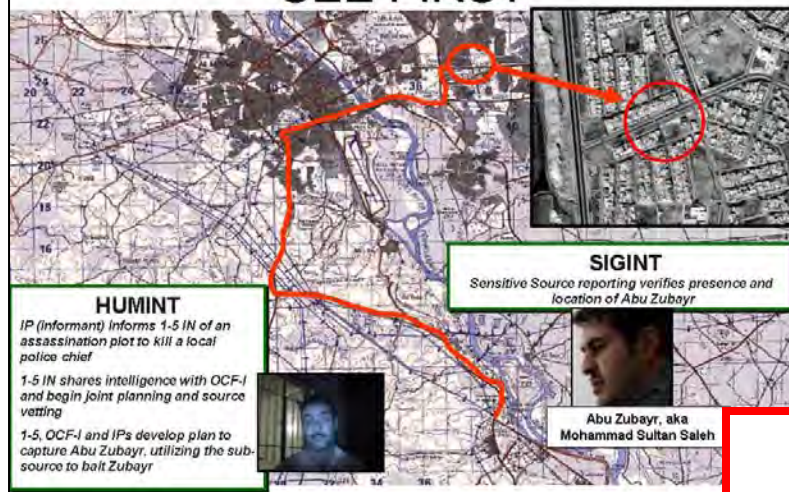
## PIRs

1. Enemy contact.
2. Location of Sadr posters /anti coalition Graphy.
3. Enemy defensive positions / roadblocks
4. IPs in zone



# A Quality of Firsts

## SEE FIRST

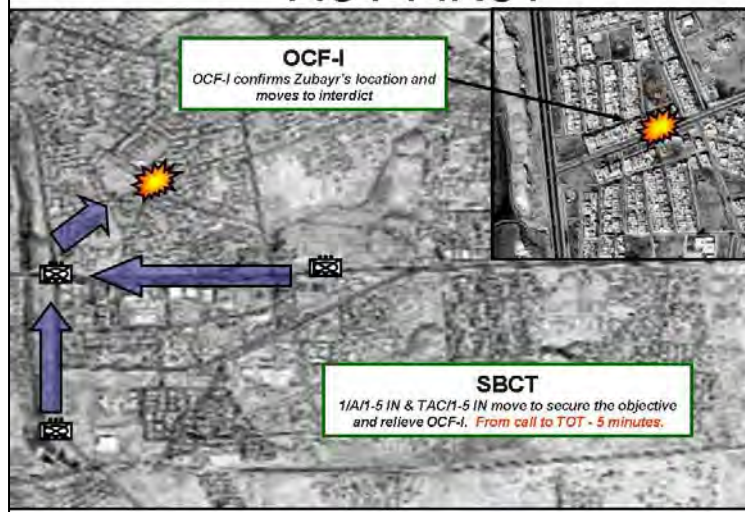


## UNDERSTAND FIRST



## FINISH DECISIVELY

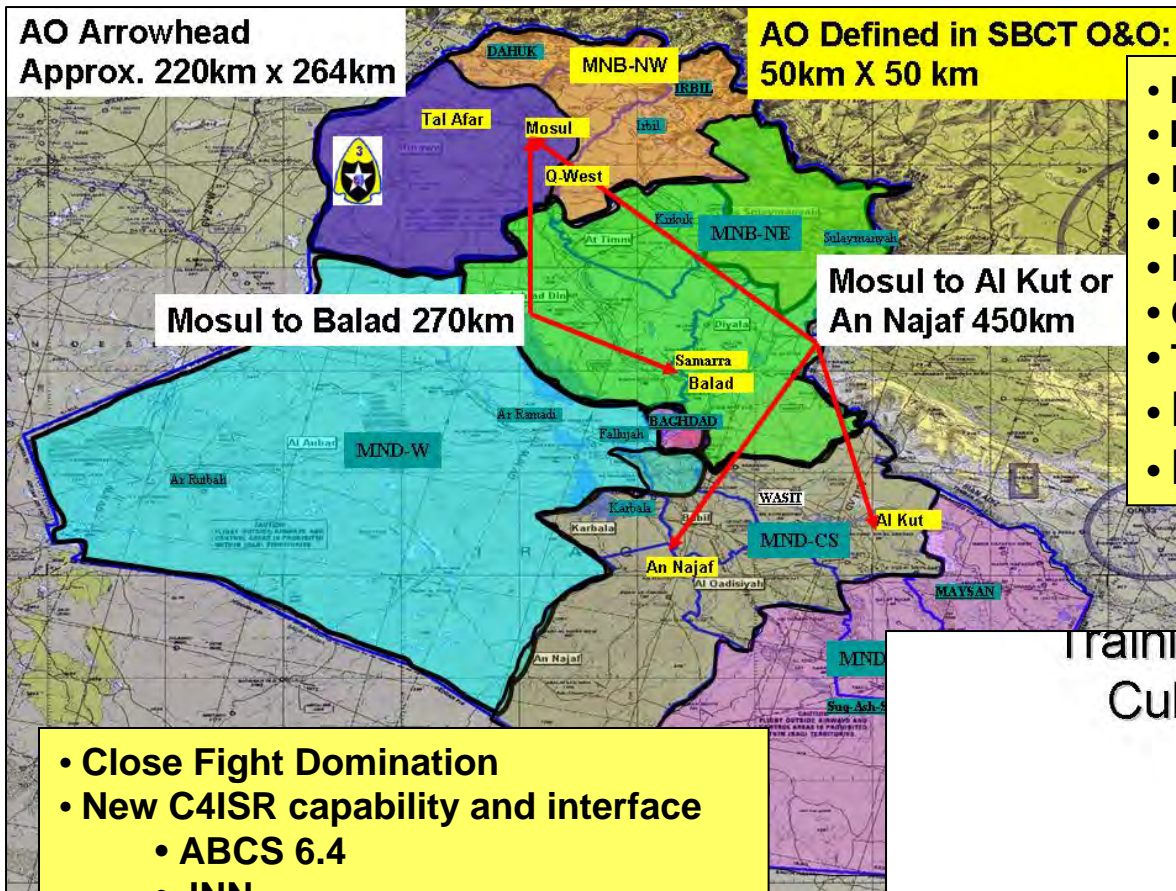
## ACT FIRST





**AO Arrowhead**  
Approx. 220km x 264km

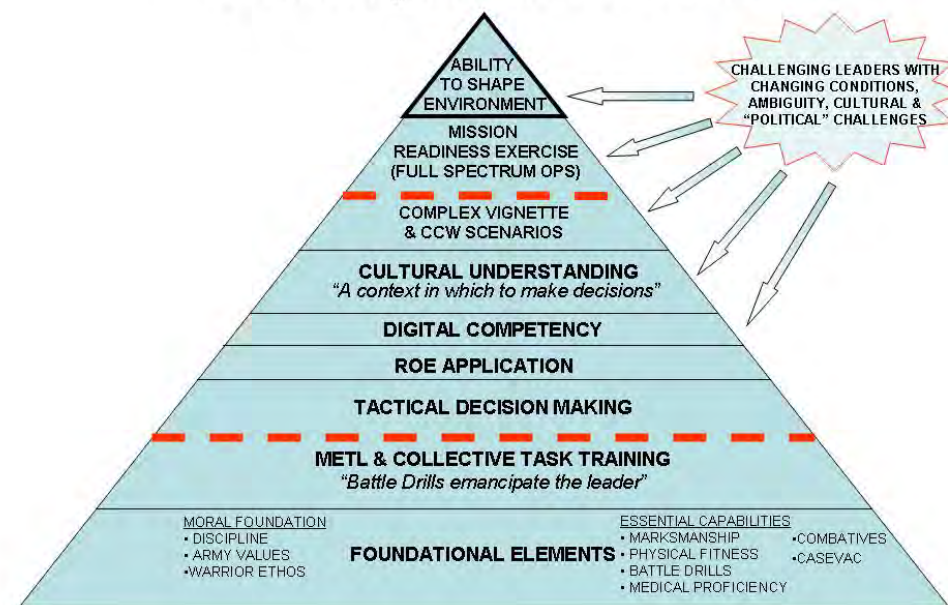
**AO Defined in SBCT O&O:**  
50km X 50 km



- Full Spectrum Dominance
- ISF Partnerships
- Non-Kinetic vs Kinetic
- IO/CMO focus
- Policeman mentality
- Company Level Fight
- The Leadership Reaction Course
- **Need Next Generation C4ISR**
- **Need Training Systems**

- Close Fight Domination
- New C4ISR capability and interface
  - ABCS 6.4
  - JNN
- New Org/Equipment
  - Combined Arms
  - MGS
- Infantry/Info Centric
  - Mortars/Snipers
  - Vehicles and Wpns Sqds
  - ABCS/C4ISR
- Logistics/Support Concepts
- Leader Training Mindset

## Training Lethal, Adaptive, and Culturally Aware Leaders







LTC Tom Plunkett

Commander

3-156<sup>th</sup> Infantry





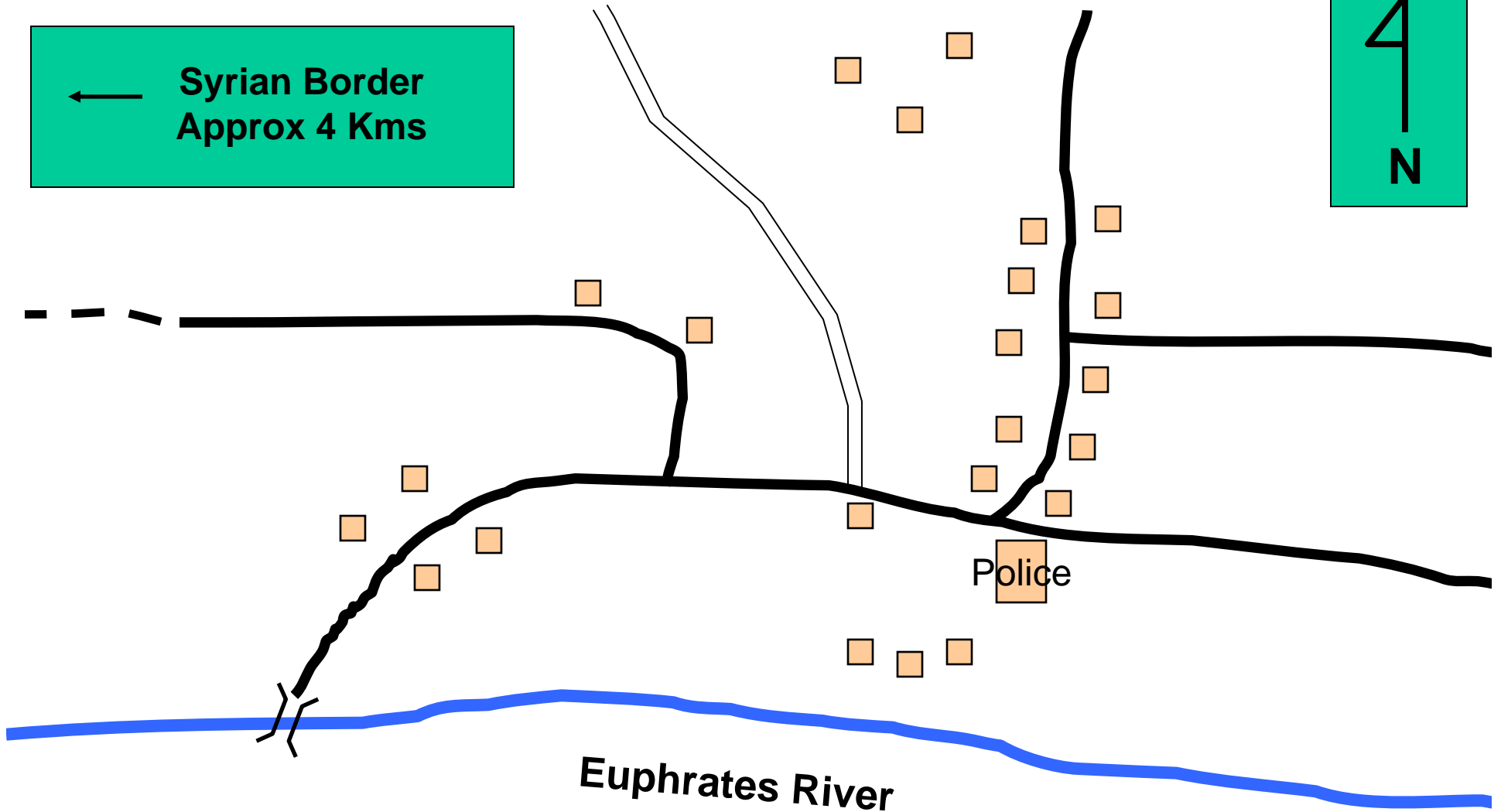
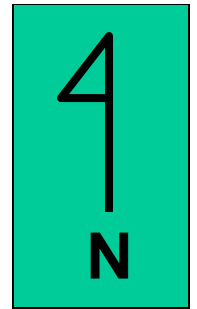
Lt Col William Costantini

Commanding Officer

1<sup>st</sup> Light Armored  
Reconnaissance Battalion

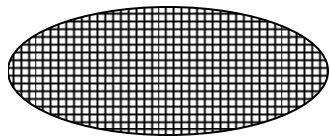


← Syrian Border  
Approx 4 Kms



Police

Euphrates River

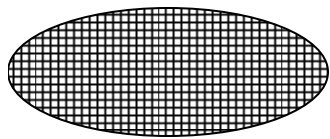
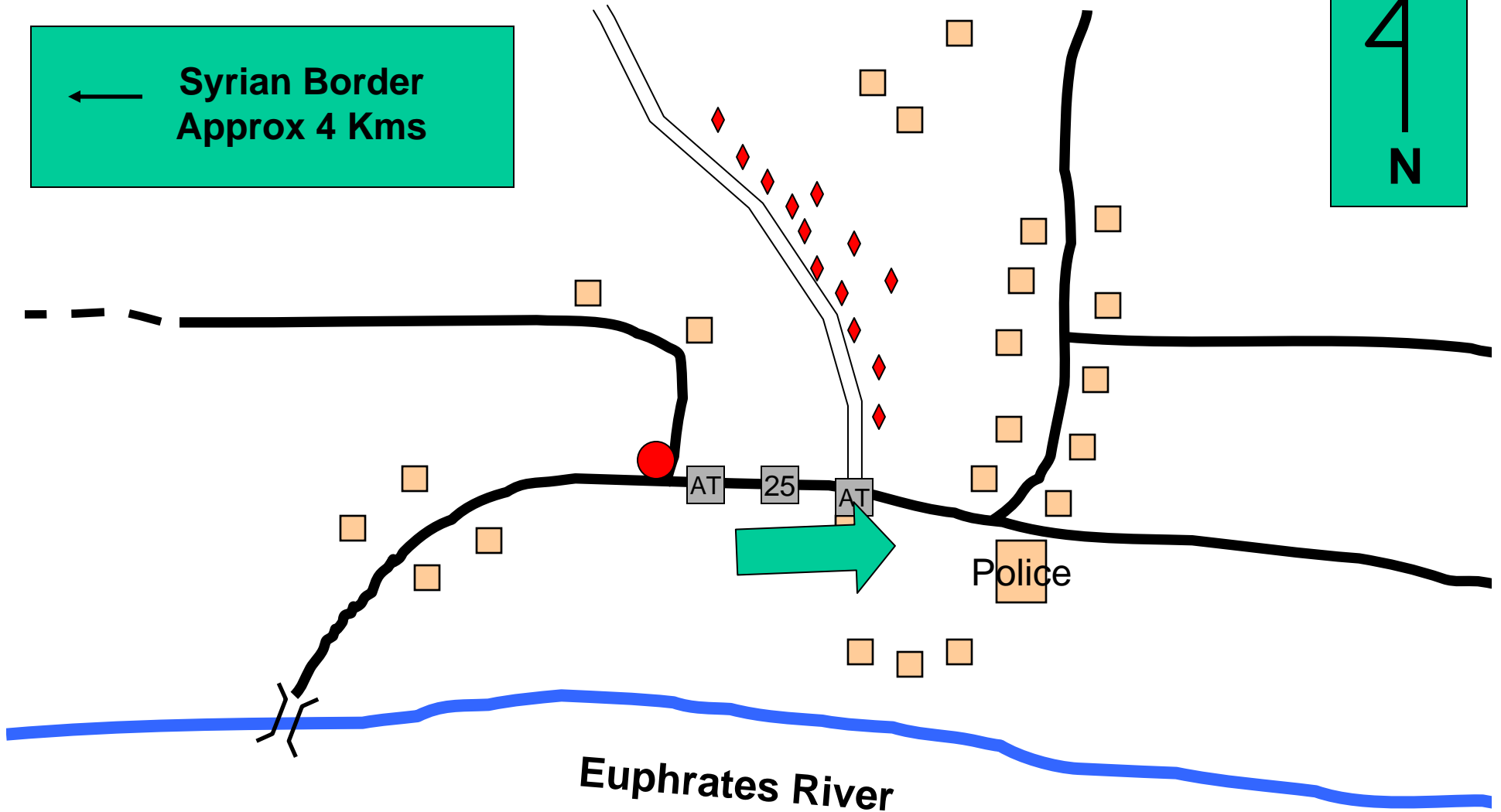
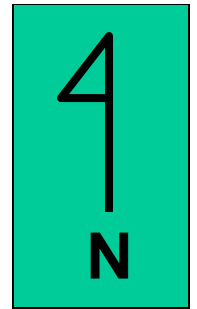


Al Qaim

Map not to scale



← Syrian Border  
Approx 4 Kms



Al Qaim

Map not to scale









BG Alan Gayhart

Commander, 116<sup>th</sup> Heavy  
Brigade Combat Team

2004-2005 Kirkuk, Iraq



# Acquiring War Fighting Capabilities in the 21st Century: The Challenge of Mega-Systems



Lieutenant General Joseph L. Yakovac, Jr.  
Military Deputy to the  
Assistant Secretary of the Army for  
Acquisition, Logistics and Technology  
11 September 2006

In Collaboration with Renee Stevens (The MITRE Corporation)

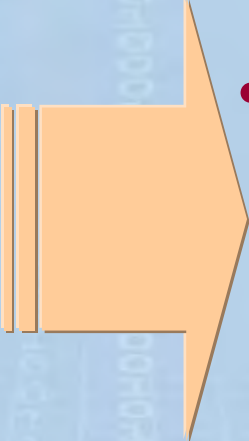


# Agenda

- **The Strategic Environment**
- **Mega-Systems**
- **Challenges For Acquiring 21<sup>st</sup> Century Capability**
- **Implications for Spiral Development**



# A Trend Towards Larger, More Complex Systems

- Uncertain strategic environment demands agile/adaptive responses
  - Information as competitive source of power
  - Information revolution provides common tools
  - Demand for enterprise and extended enterprise-wide solutions
- 
- Richly *interconnected*; increasingly *interdependent*
  - *Cross traditional boundaries... functional, organizational, programmatic*
  - *Increasing scale/scope*
  - *Increasing complexity*



# A Working Definition

- **Mega-Systems defined as “*large scale, potentially complex systems that cross traditional boundaries to provide capability beyond that achievable by their component elements*”**
  - **Composed – Formed “after the fact” from the integration of previously developed systems**
  - **Designed – Structured as formal acquisition programs**
  - **Dynamically assembled – Respond to immediate operational need or opportunity**
- **Often a significant *human and social dimension* that contributes to complexity of behavior and evolution of the Mega-System**



# ... Demands Different Approach

## **Traditional Program**

- Predicated on well defined, precise and stable requirements
- Assumes that overall functions can be decomposed and allocated
- Manage execution risk
- Applies best within a single program and when there is agreement as to goals and objectives and a well-understood mission space



## **Mega-System or Enterprise Network**

- Requirements often stated as vision statements or broad architectures.  
*Evolve opportunistically.*
- Some functionality will emerge from interaction of components without specific direction
- Manage uncertainty - both risk and unanticipated opportunities
- Often cross program boundaries; must deal with competition for resources and alternative solutions



# Emerging Framework





# Emerging Framework

- **Typical program domain**
  - *Traditional systems engineering*
  - *Chief Engineer inside the program; reports to program manager*
- **Transitional domain**
  - *Systems engineering across boundaries*
  - *Influence vs authority*
- **Messy frontier**
  - *Political engineering (power, control...)*
  - *High risk, potentially high reward*
  - *Foster cooperative behavior*



# What Needs To Change

- **More flexible, less prescriptive requirements lead to risks in programming & budgeting in out-years. So?**
  - Services, osd, congress, & defense industry must accept risk.
  - Keepers of “ility” keys – users (services & joint), testers, log community, etc., Must accept risk.
- **More “truly” joint programs managed from a “real” joint program office.**
- **The entire defense industry. Why?**
  - Fewer, more expensive programs.
  - Need to better leverage commercial vice military-unique.
  - Need hardware/software commonality to ensure affordability.